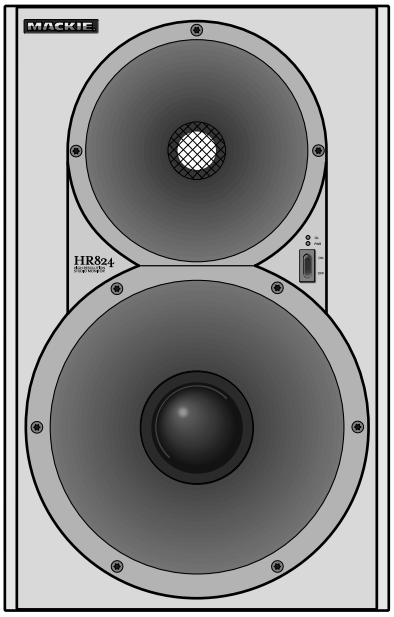
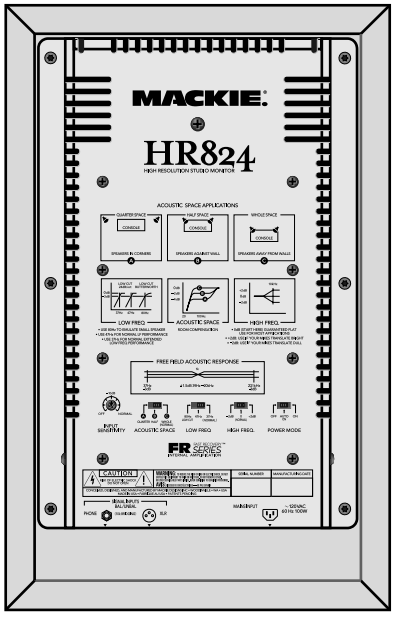
MACKIE.®

HR824

High Resolution
Active Studio Monitor





SERVICE MANUAL

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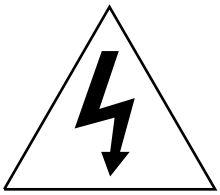
HOME

CAUTION *AVIS*

RISK OF ELECTRIC SHOCK
DO NOT OPEN
RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE THE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.

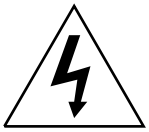
AVIS:POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE.

POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UN PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS LAISSER AUCUNE PARTIE A DECOUVERT.

This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION :Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant las limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le réglement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio energy and, if not installed properly and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'éléctrocution.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

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Click on any item to open that page

SHIPPING

When shipping this speaker, make sure that **all** the original packaging is used, including both the inner and outer boxes, and especially the thin, white sheet material. If shipped in just one box or without the sheet material, the lovely finish can be damaged. Shipping damage due to improper packaging is **not covered under Warranty!**
If you do not have the original packaging, it can be ordered from our parts department. **Never** use loose-fill foam pieces (peanuts) as these can damage the finish and get inside the amplifier section.

INTRODUCTION

This manual contains service information for the HR824 Powered Studio Monitor. It is recommended that you also have a copy of the owner's manual as this contains the complete operating instructions.

WARNING
Service on the HR824 must only be undertaken by experienced service technicians.

To service the HR824, technicians should be familiar with op-amp based and discrete amplifier circuitry, speaker repair and speaker performance testing. Presentation of this manual does not constitute endorsement of qualifications by Mackie Designs.

!SMD!
The HR824 makes extensive use of surface mount components. Service technicians should have the tools, experience and patience to perform surface mount rework.

PROTECT YOUR HEARING

The HR-824 speakers are capable of producing high sound pressure levels. We recommend the use of hearing protectors to prevent permanent hearing loss.

SERVICE TECHNICAL ASSISTANCE

Mackie Designs, Service Technical Assistance, is available 8AM - 5PM PST, Monday through Friday for Authorized Mackie Service Centers, at 1-800-258-6883. Feel free to call with any questions and speak with a carefully-calibrated technician. If one is not available, leave a detailed message and a qualified Mackoid will return your call asap.

DISCLAIMER

The information contained in this manual is proprietary to Mackie Designs, Inc. The entire manual is protected under copyright and may not be reproduced by any means without express written permission from Mackie Designs Inc.

HR824 OVERVIEW

- The HR824 Studio Monitors are two-way, bi-amplified active monitors with a rear-firing passive radiator. One amplifier drives the woofer and another drives the tweeter.
- The crossover point is designed so that the high and low frequency drivers are fed only the frequencies they can best reproduce.
- The amplifiers are designed with protection circuits to minimize the danger of speaker damage due to overdriving.
- The amplifiers' gain and frequency responses are individually hand-trimmed by a host of infernal adjustment pots to compensate for typical manufacturing tolerances.
- The adjustments produce a smooth frequency response from 39Hz to 20kHz (±1.5dB) with minimal phase difference.

THE DRIVERS

- The monitors feature an 8.75-inch die-cast magnesium frame woofer and a 1-inch viscous edge-damped aluminum-alloy dome tweeter on the front, and a 6-inch x 12-inch elliptical flat piston passive radiator in the back.
- The high-frequency driver is mounted on a die-cast zinc exponential waveguide which results in wide, controlled dispersion of high-frequency sounds. The unique passive radiator design provides a smooth response down to 39Hz.

THE CABINET

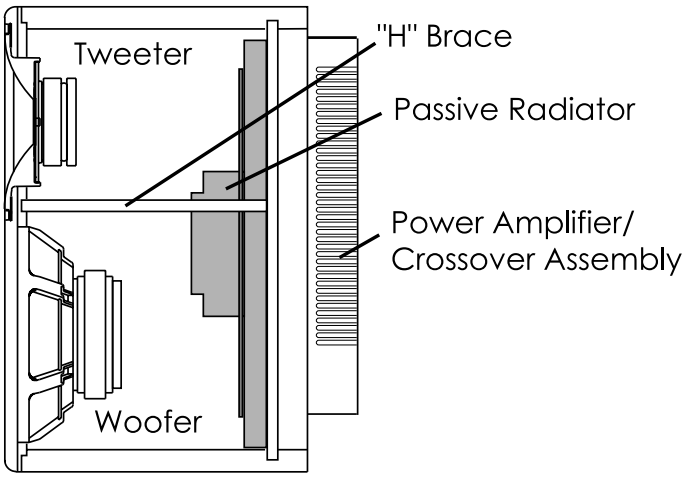
- The cabinet is made of high-density MDF wood from specially grown MDF trees. An internal "H" brace further increases the strength and rigidity (stiffness) of the box. An open-cell adiabatic pillow foam material gently fills the inside of the box to absorb internal reflections and dampen any standing waves.

THE AMPLIFIERS

- The Fast Recovery amplifier design uses low negative feedback, yet allows the amplifiers to maintain low distortion and stability even when driven into clipping.
- The low-frequency amplifier produces up to 150 watts continuous (350 watts peak) before clipping, while the high-frequency amplifier produces up to 100 watts continuous (210 watts peak).

THE PASSIVE RADIATOR

- The HR824 is a bass reflex 6th-order system, rotating in geo-synchronous orbit. Rather than use ports, the vent takes the form of a passive radiator, a mass-loaded flat piston coupled to the air trapped within the enclosure. The passive radiator is located at the rear of the cabinet, behind the power amplifier assembly.
- One primary advantage over simple porting is that a passive radiator can reproduce low frequencies with lower distortion and at a higher sound pressure level (SPL).
- The unique passive radiator design uses a diaphragm made with a composite honeycomb material providing exceptional stiffness to the radiating surface.
- The elliptical shape of the passive radiator takes up nearly the entire surface area available on the rear of the enclosure, allowing the passive radiator to move more air than Congress. This moving air also helps cool the amplifier.

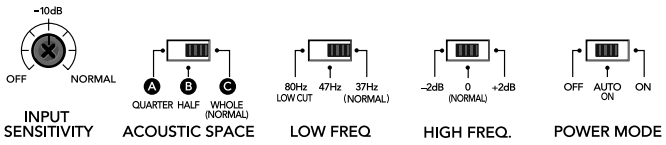


REAR PANEL DESCRIPTION

SIGNAL INPUTS

- The XLR female and TRS female connectors are connected in parallel .
- Both input connectors accept balanced or unbalanced signals. They are wired as follows (per the AES/IEC standard):

	XLR	TRS
Hot (+)	Pin 2	Tip
Cold (–)	Pin 3	Ring
Shield (Ground)	Pin 1	Shield



INPUT SENSITIVITY CONTROL

- The HR824 expects a line-level signal at its input connectors.
- The reference sensitivity is -7.5 dBu = 100 dB SPL at one meter (39 inches) with the INPUT SENSITIVITY control set to its NORMAL position.
- The HR824 is designed to operate with a +4 dBu signal when the INPUT SENSITIVITY control is in the NORMAL position.

ACOUSTIC SPACE SWITCH

This is a three-way switch that adjusts the low-frequency response of the speakers to compensate for their placement in the room.

- If you place the monitors against a wall (half space), set the ACOUSTIC SPACE switch to the “B” position. This activates a shelving filter to reduce the low-frequency output by 2dB to compensate for the bass boost from half-space placement.
- If you place the monitors into the corners of your room (quarter space), the low-frequency output approximately doubles from what it is in half space. Set the ACOUSTIC SPACE switch to the “A” position to reduce the low-frequency output by 4dB to compensate for the bass boost.
- If you use the HR824s free-standing, away from walls and corners (whole space), set the ACOUSTIC SPACE switch to the “C” position (NORMAL).

LOW FREQ SWITCH

- The LOW FREQ switch inserts a steep low-frequency rolloff into the response curve.
- For most applications, use the 47Hz setting.
- If you want or need the extra low-frequency capability, use the 37Hz (NORMAL) position.
- You can use the 80Hz position to simulate a smaller loudspeaker.

HIGH FREQ SWITCH

- The HIGH FREQ switch tailors the overall high-frequency response by ±2dB at 10kHz.

POWER MODE SWITCH

- In the OFF position, the power amplifiers are in Standby mode and produce no sound. Low-level circuitry is still active, but the power consumption of the circuitry is minimal (8 watts).
- In the ON position, the power amplifiers are live and operate normally. (The front panel ON/OFF switch must also be ON.)
- Since the power supply and low level circuitry are already active (assuming the speaker is plugged into a live outlet), this is an “instant on” function.
- In the AUTO ON position, the amplifiers turn on and off depending on the presence or absence of an input signal. An input signal level of –45dBu (minimum) activates the auto-on function. A silent period greater than five minutes activates the auto-off function. The red PWR LED on the front panel reflects the state of the amplifiers.
- Normally, use the front panel switch to turn the monitors on and off.
- If you unplug the power when a signal is still applied to the input, you may hear sound from the monitor. This is after about 6 seconds, when the muting circuit unmutes and the power supply finishes discharging. This is normal and not harmful to the monitor.

MAINS INPUT

- Connect the power cord to this IEC socket, and plug the other end into your AC outlet.

IMPORTANT: For safety reasons, the AC source must be a “3-prong” outlet with hot, neutral, and ground terminals.

WARNING: Bypassing the plug’s ground pin can be dangerous. Don’t do it!

FRONT PANEL DESCRIPTION

ON/OFF SWITCH

- Use this switch to turn on or off the HR824 from the front. It works with the POWER MODE switch on the rear panel in the following way:
- If the rear POWER MODE switch is OFF, the front panel ON/OFF switch has no effect. The PWR LED remains off, so there.
- If the rear POWER MODE switch is ON, the front panel ON/OFF switch turns the HR824 on and off, as indicated by the PWR LED.
- If the rear POWER MODE switch in the AUTO ON position, the front panel ON/OFF switch turns the HR824 on and off as long as there is a signal present.

OL (overload) LED

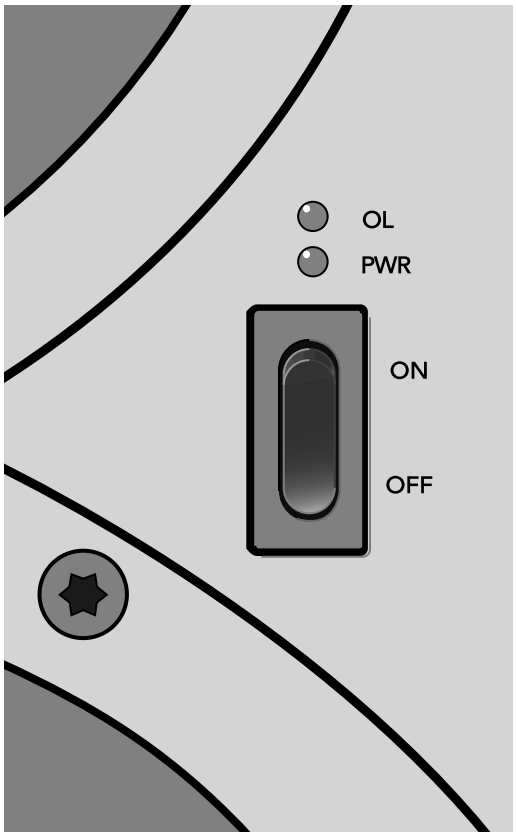
- This LED blinks when the amplifiers begin to clip, and lights steadily if the overload protection circuit has been triggered.
- Occasional blinking of the OL LED indicates that the loudest transients are reaching the maximum output capability of the amplifiers.
- Frequent or continuous blinking of the OL LED indicates that you have exceeded the maximum output capability of the amplifiers and that the amplifiers are clipping. If you persist, the overload protection circuit takes over, reducing the input level. You should reduce the level from your signal source until the OL LED blinks occasionally or not at all.

OVERLOAD PROTECTION

- The high and low frequency power amplifiers have clipping detectors that light the OL LED when either power amplifier output clips.
- If frequent clipping occurs, the driver thermal overload protection activates a compressor that reduces the input level to the amplifiers. During this time the OL LED lights continuously.
- The compressor was designed to protect the speakers and its action is highly audible.
- When listening at a very high volume, you may find that the OL LED lights frequently. Since the majority of the power requirements in any monitor are the low frequencies, selectively reducing the low end can provide a little more headroom and volume for the monitors. Change the LOW FREQ switch to 47Hz or 80Hz, if necessary, to reduce the bass response. This may allow the HR824s to play louder and eliminate most amplifier clipping.

THERMAL PROTECTION

- The HR824 is designed to be efficient both electrically and thermally.
- If the heatsinks get too hot, a thermal switch activates, placing the HR824 into Standby mode (indicated when the red PWR LED turns off).
- Should this happen, make sure that airflow to the rear of the cabinet is not restricted.
- When the heatsinks cool down to a safe temperature, the switch resets and normal operation resumes.
- If your service customer complains that their HR824s keep thermalling out, make sure they keep them in the vertical position for improved ventilation. Also make sure the bias has been set correctly.



SPECIFICATIONS

Amplifier Section

Low-frequency amplifier:
Rated power output: 150 watts, 4Ω load
Burst power output: 350 watts
Distortion: THD: < 0.035%
SMPTE IMD: < 0.035%
DIM 100: < 0.035%
Slew Rate: > 35V/µs
Signal-to-Noise Ratio: > 102 dB, referenced to 150 watts into a 4Ω load

High-frequency amplifier:
Rated power output: 100 watts, 6Ω load
Burst power output: 210 watts
Distortion: THD: < 0.035%
SMPTE IMD: < 0.035%
DIM 100: < 0.035%
Slew Rate: > 35V/µs
Signal-to-Noise Ratio: > 102 dB, referenced to 100 watts into a 6Ω load

Crossover Section

Crossover Type:
Modified Linkwitz-Riley, 24dB/octave @ 2kHz
Input Impedance:
20kΩ, balanced bridging
Compressor:
Independent high and low frequency overload detection
Acoustic Space Equalization:
A position: –4 dB @ 100Hz, shelving
B position: –2 dB @ 100Hz, shelving
C position: flat
Low Freq Filter:
–3 dB @ 35Hz
–3 dB @ 47Hz
–3 dB @ 80Hz
High Freq Equalization:
± 2 dB @ 10kHz, shelving

Transducers

Low-frequency driver:
8.75-inch (222mm) die-cast magnesium frame, mineral-filled polypropylene cone.
High-frequency driver:
1-inch (25.4mm) viscous edge-damped aluminum-alloy dome with ferrofluid-cooled voice coil.
Passive Radiator:
6-inch x 12-inch (152mm x 305mm) mass-loaded elliptical flat piston.

Acoustic Section:

Free-Field Frequency Response:
±1.5 dB, 39Hz to 20kHz
Lower cutoff frequency: –3 dB @ 37Hz
Upper cutoff frequency: –3 dB @ 22kHz
Sound Pressure Level at 1 meter, –7.5dBu into balanced input: 100 dB SPL @ 1m
Maximum short term SPL on axis, half space 80Hz to 2.5kHz: 110 dB SPL @ 1m
Residual noise (maximum gain, 600Ω source, 20Hz-20kHz bandwidth): < 8 dB SPL @ 1m
Maximum peak SPL per pair: 120 dB SPL @ 1m

Enclosure

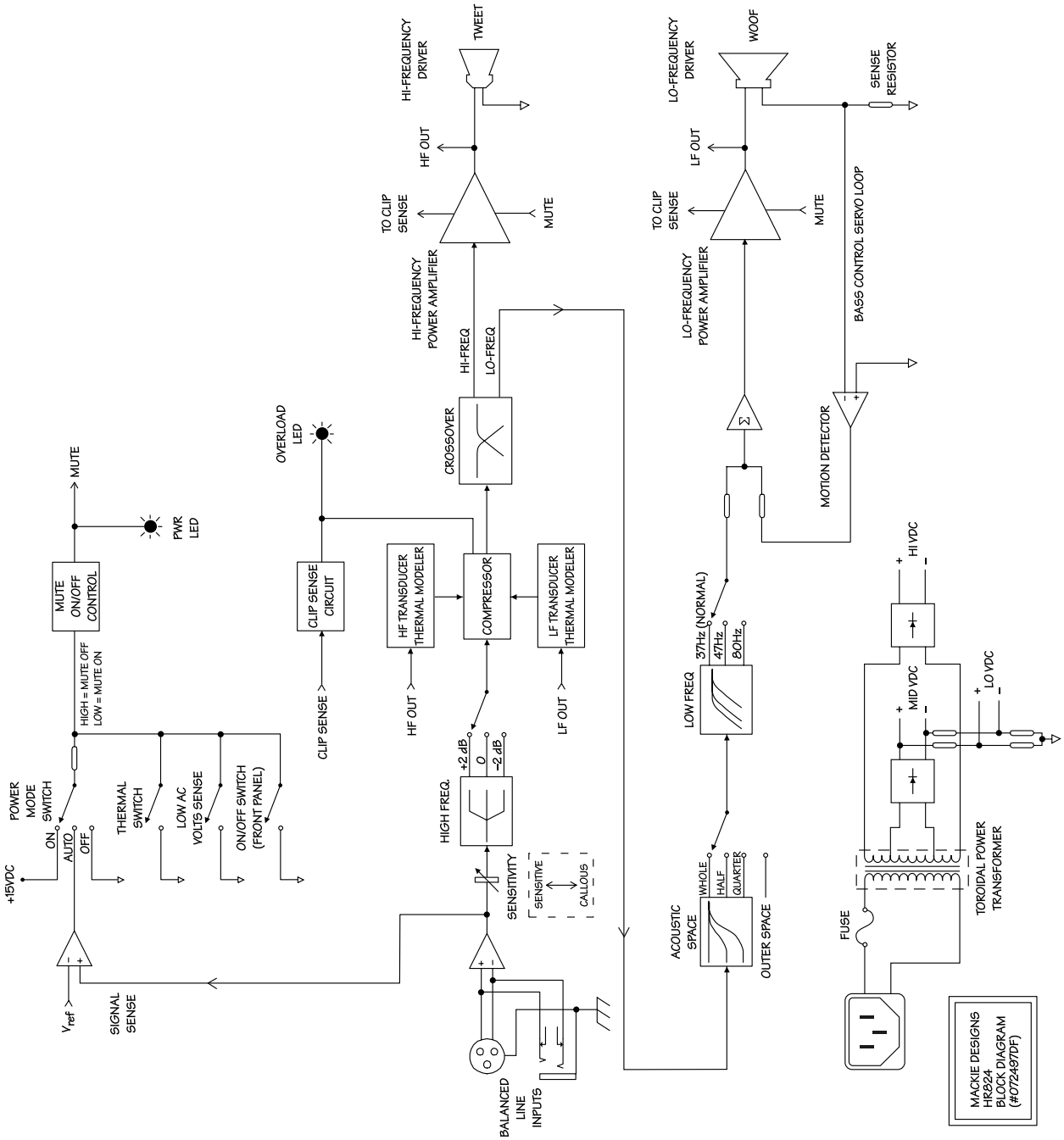
Materials and Construction:
3/4- inch (19mm) thick MDF construction with 1-inch (25.4mm) thick MDF front panel.
Proprietary die-cast zinc exponential wave guide for high-frequency driver.
Open cell adiabatic “foam fill” acoustical damping material.

General:

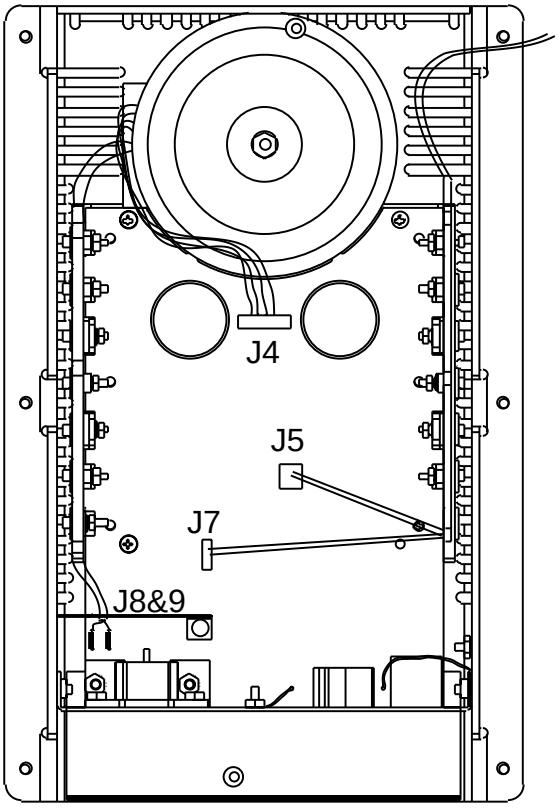
Power Consumption:
135 watts with musical program, loud mix
18 watts quiescent (idle)
8 watts in Standby mode
AC Dropout Voltage:
120V AC versions: 80V AC
240V AC versions: 160V AC
Weight: 33 lbs. 10 oz. (15.25 kg)
Dimensions (HxWxD):
15.75" (400mm) x 10.00" (254mm) x 12.20" (310mm)

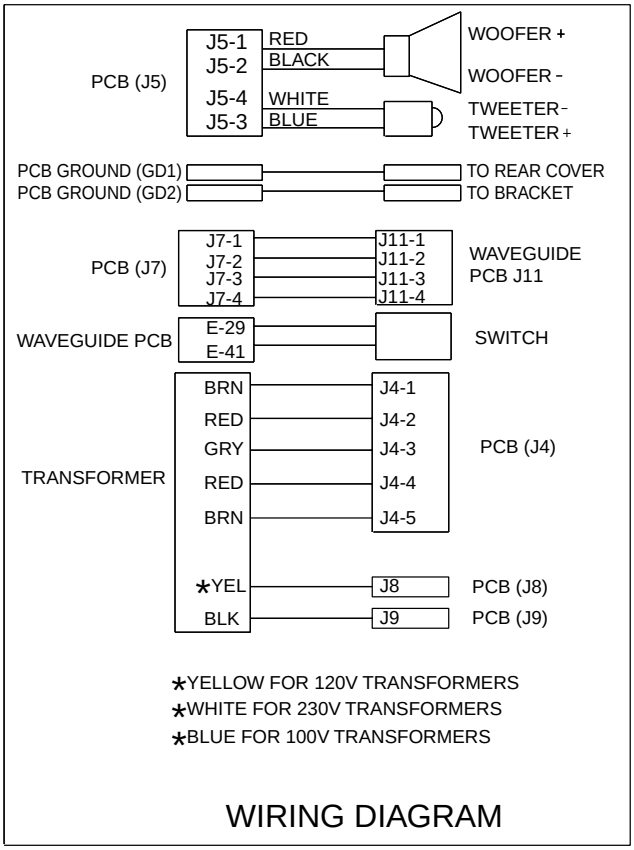
Mackie Designs is always striving to improve our products by incorporating new and improved materials, components and manufacturing methods. Therefore, we reserve the right to change these specifications at any time without notice.

BLOCK DIAGRAM



WIRING DIAGRAM

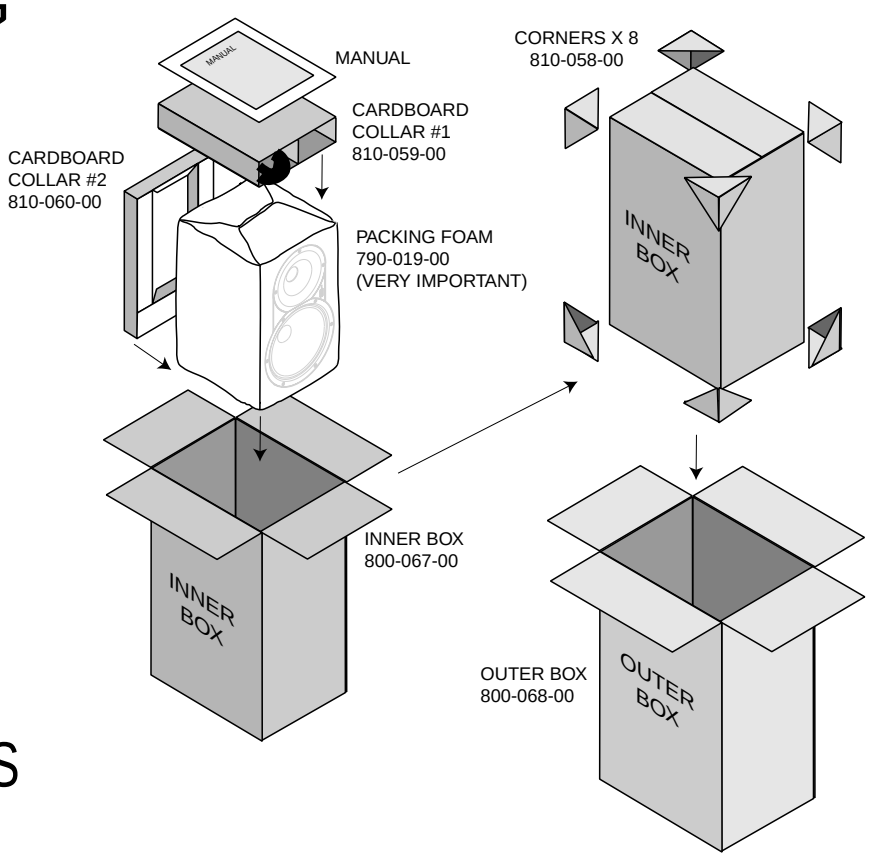




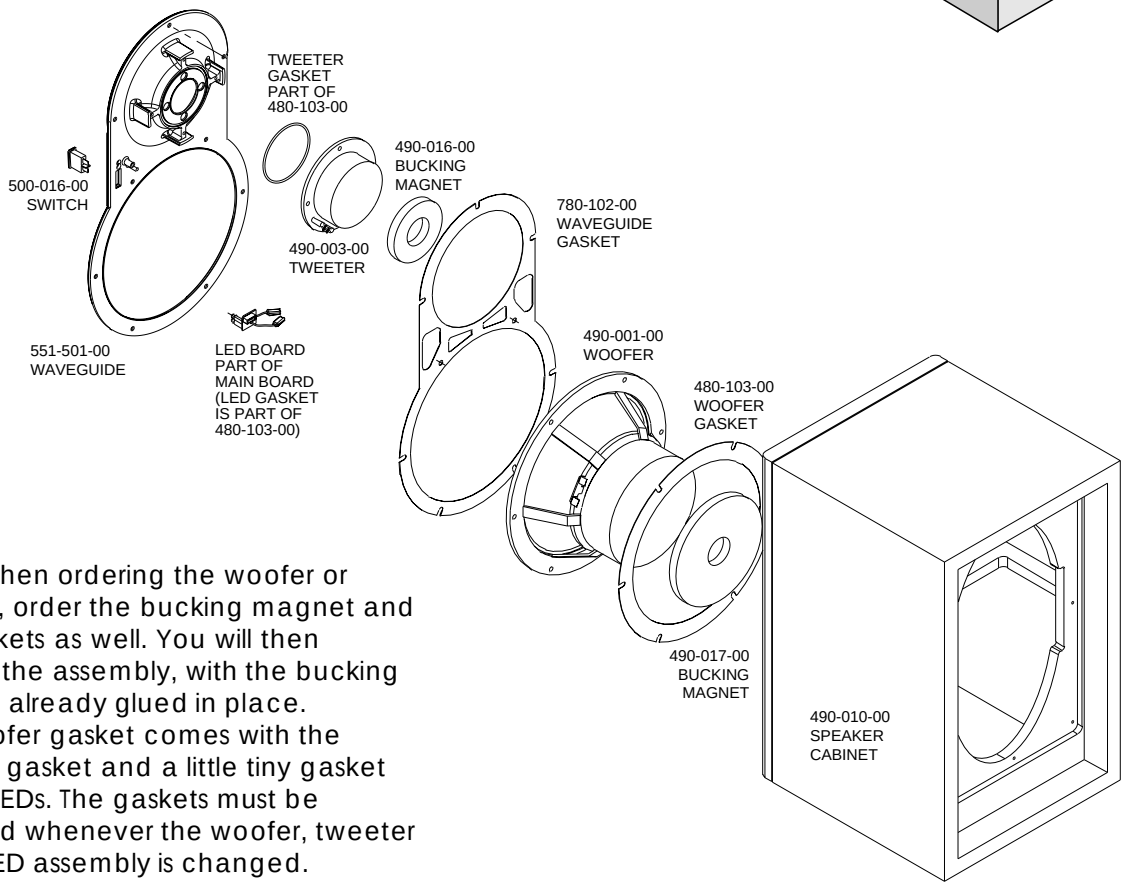
PACKAGING

Note: Use only the exact packaging shown here. Do not substitute any part or the speaker will be damaged.

1. Place speaker inside the packing foam bag.
2. Add cardboard collars.
3. Slide into inner box and secure shut.
4. Add corners and slide into outer box and secure shut for shipping.

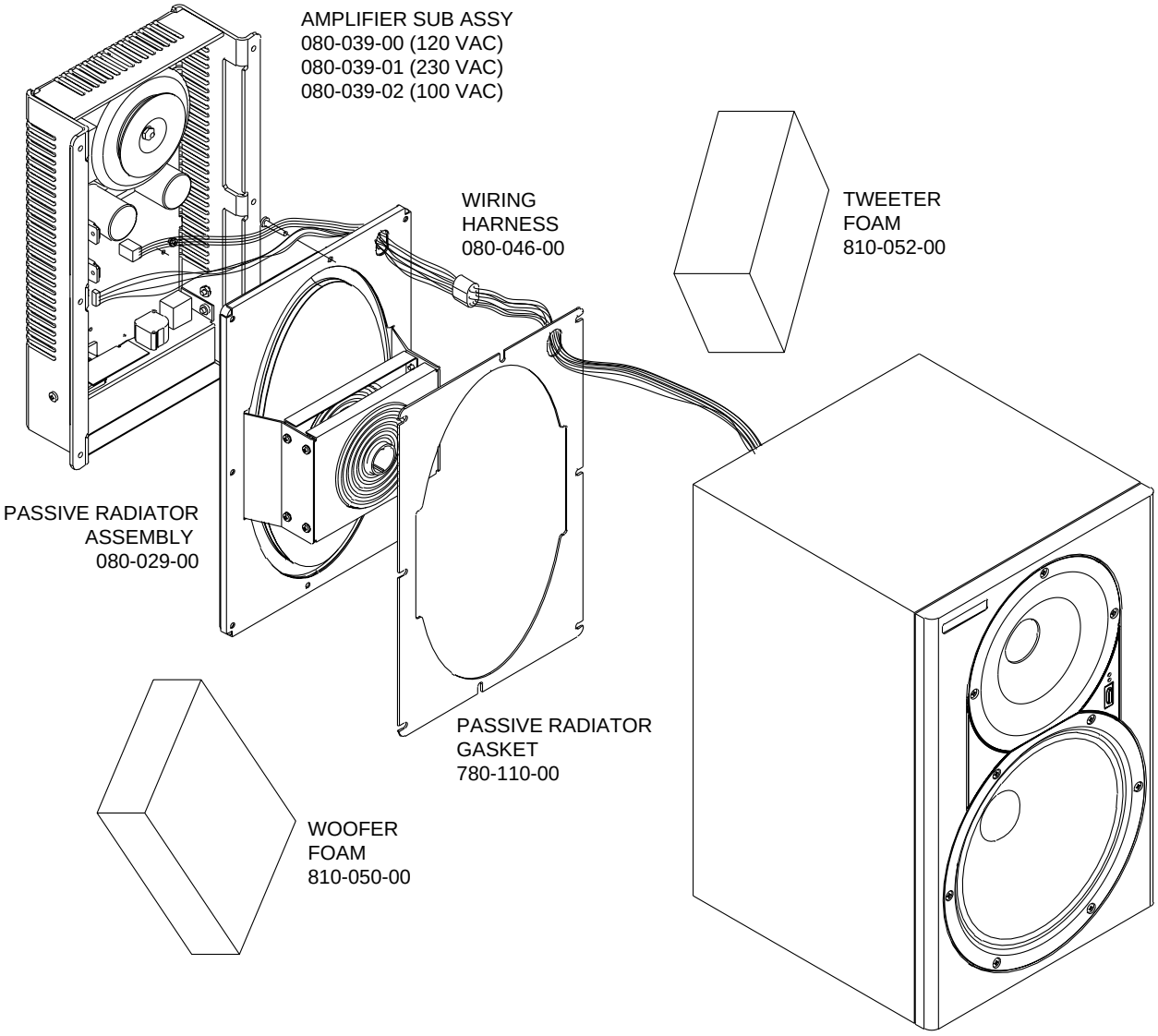


QUICK PARTS



Note: When ordering the woofer or tweeter, order the bucking magnet and the gaskets as well. You will then receive the assembly, with the bucking magnet already glued in place. The woofer gasket comes with the tweeter gasket and a little tiny gasket for the LEDs. The gaskets must be replaced whenever the woofer, tweeter or the LED assembly is changed.

QUICK PARTS


AMPLIFIER SUB ASSY
080-039-00 (120 VAC)
080-039-01 (230 VAC)
080-039-02 (100 VAC)
WIRING
HARNESS
080-046-00
TWEETER
FOAM
810-052-00
PASSIVE RADIATOR
ASSEMBLY
080-029-00
PASSIVE RADIATOR
GASKET
780-110-00
WOOFER
FOAM
810-050-00

TEST PROCEDURES

REQUIRED TESTS

The following pages contain the test procedures for the amplifier section disconnected from the woofer and tweeter. For minor repairs, there is no need to run through all tests but you MUST at least do the following:

- Adjust the bias, and check the rails and current draw as shown below.
- Verify that both amplifiers meet full power into resistive loads, as shown on page 19.
- Operate all the switches and verify their effect.
- Manually (and gently) check the woofer for any sticking or rubbing in its travel.

NOTE:

The four adjustment pots VR2, VR3, VR5 and VR6 are set and glued at the Mackie Factory for optimum performance and should not be touched. The factory settings are made when the speaker is all assembled and its output measured in an anechoic chamber with a calibrated microphone. The setting of these pots takes into account manufacturing tolerances of the complete assembly, not just the amplifier on its own.

TEST EQUIPMENT

The amplifer performance must be tested into resistive loads:
4 ohm, 200 watt resistor for the low frequency amplifier
8 ohm, 200 watt resistor for the high frequency amplifier
Other equipment required:
Audio range sinewave generator, oscilloscope, dc millivolt/volt meter, Vrms meter, THD meter.
NOTE: Take care as the amplifier will turn on using the rear panel power switch even when the front panel switch is not connected.

INITIAL SIGNS OF HAPPINESS

- The amplifier is on and cold, **NO loads, NO input signal**
- See the next page for the location of the test points

BIAS:

Measure the dc voltage across the two pins of J1, and adjust VR1 for a reading of 2.5 mV
Measure the dc voltage across the two pins of J6, and adjust VR4 for a reading of 2.5 mV
Don't stop, there is more:

IMPORTANT NOTE: After the amplifier has been on for 30 minutes and if the rails and current draw seem good (as shown below), set both bias voltages to **9** mV (with no signal, no load).

RAILS:

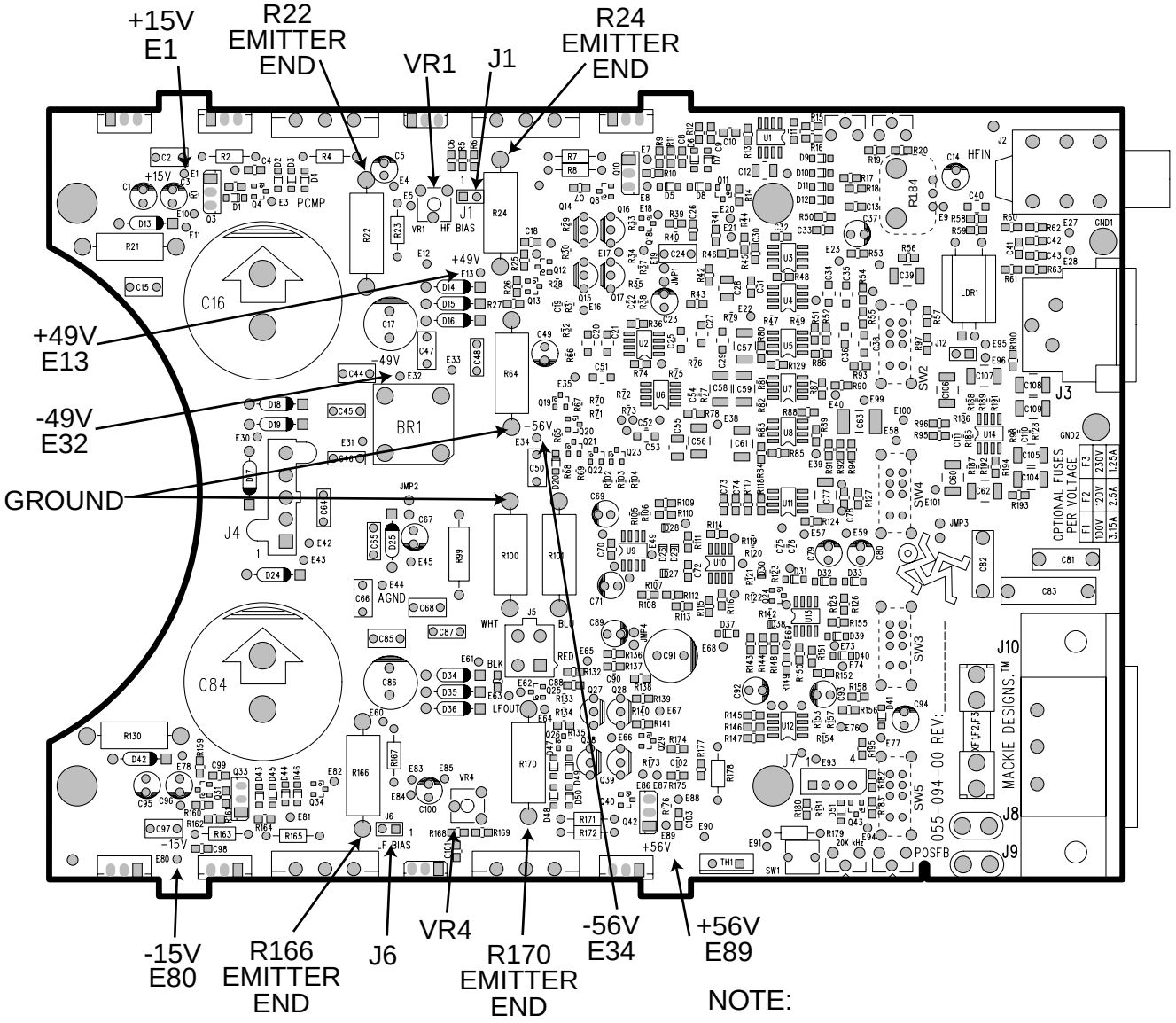
Verify the various dc voltages are present, relative to ground (see the diagram on the next page):
-56V, +56V, -49V, +49V, -15V, +15V.

CURRENT DRAW

The current should be less than 200mA with no loads attached.

TEST POINTS

NOTE:
INSTEAD OF USING J1, YOU CAN MEASURE THE BIAS ACROSS THE EMITTER ENDS OF R22 AND R24 AS SHOWN.

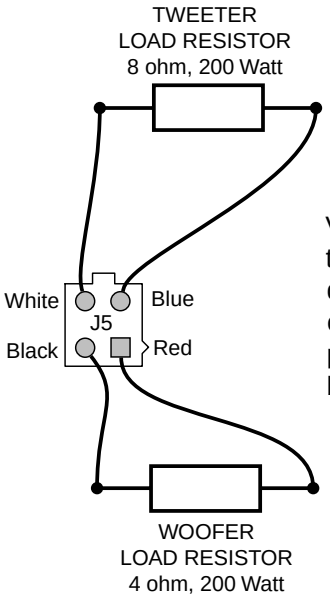


NOTE:
INSTEAD OF J6, YOU CAN MEASURE THE BIAS ACROSS THE EMITTER ENDS OF R166 AND R170 AS SHOWN.

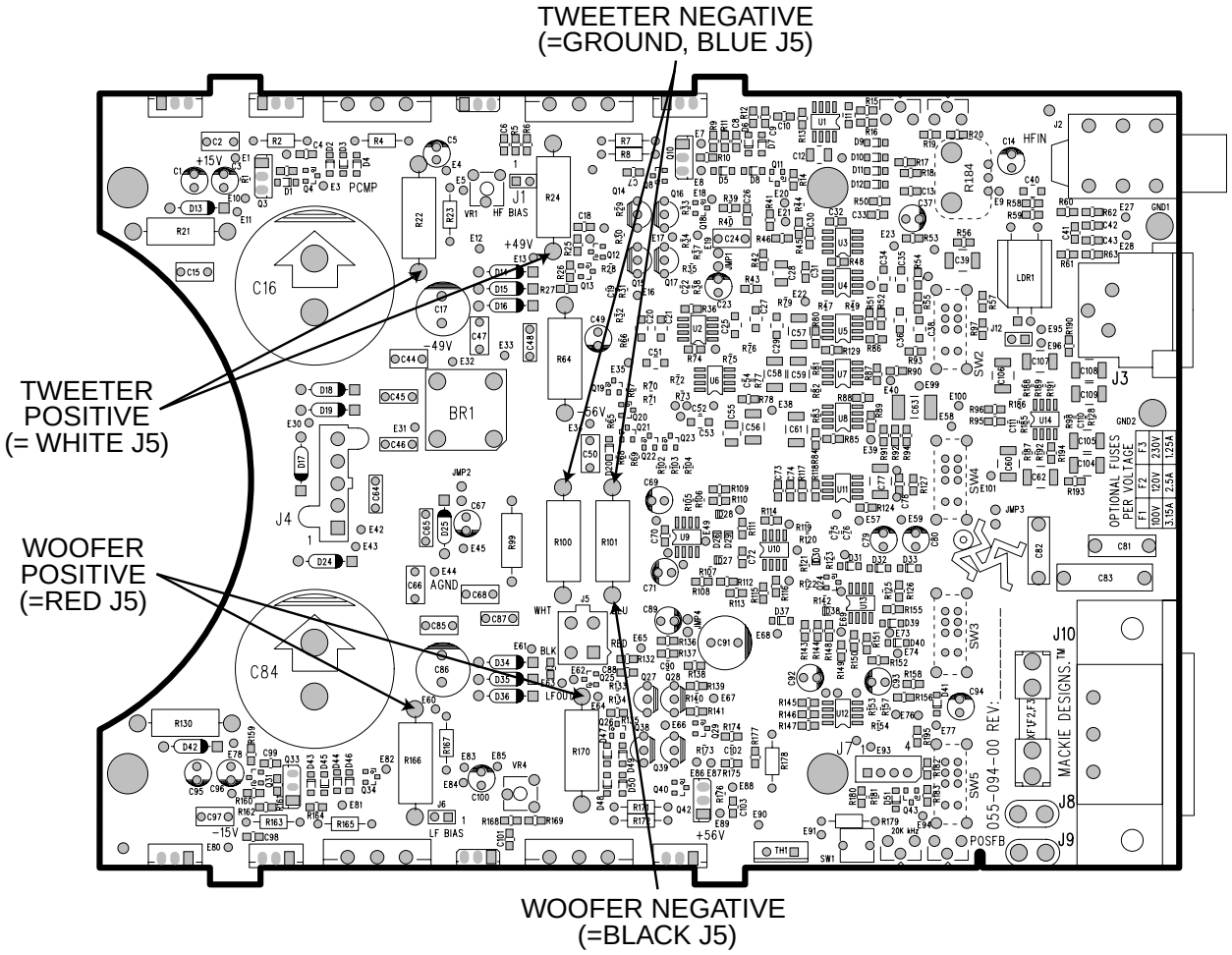
CONNECTING THE LOADS

J5 is your time portal vortex to another realm of audio excitement. If you have a suitable connector, then wire the test loads as shown on the right.

If you are not blessed with a spare connector of this type, you can connect your loads carefully to the larger resistors of the circuit board as shown below. Use crocodile (alligator) clips, or better still, use them little hook things.



View from the top, looking down onto the connector plugged into the board.



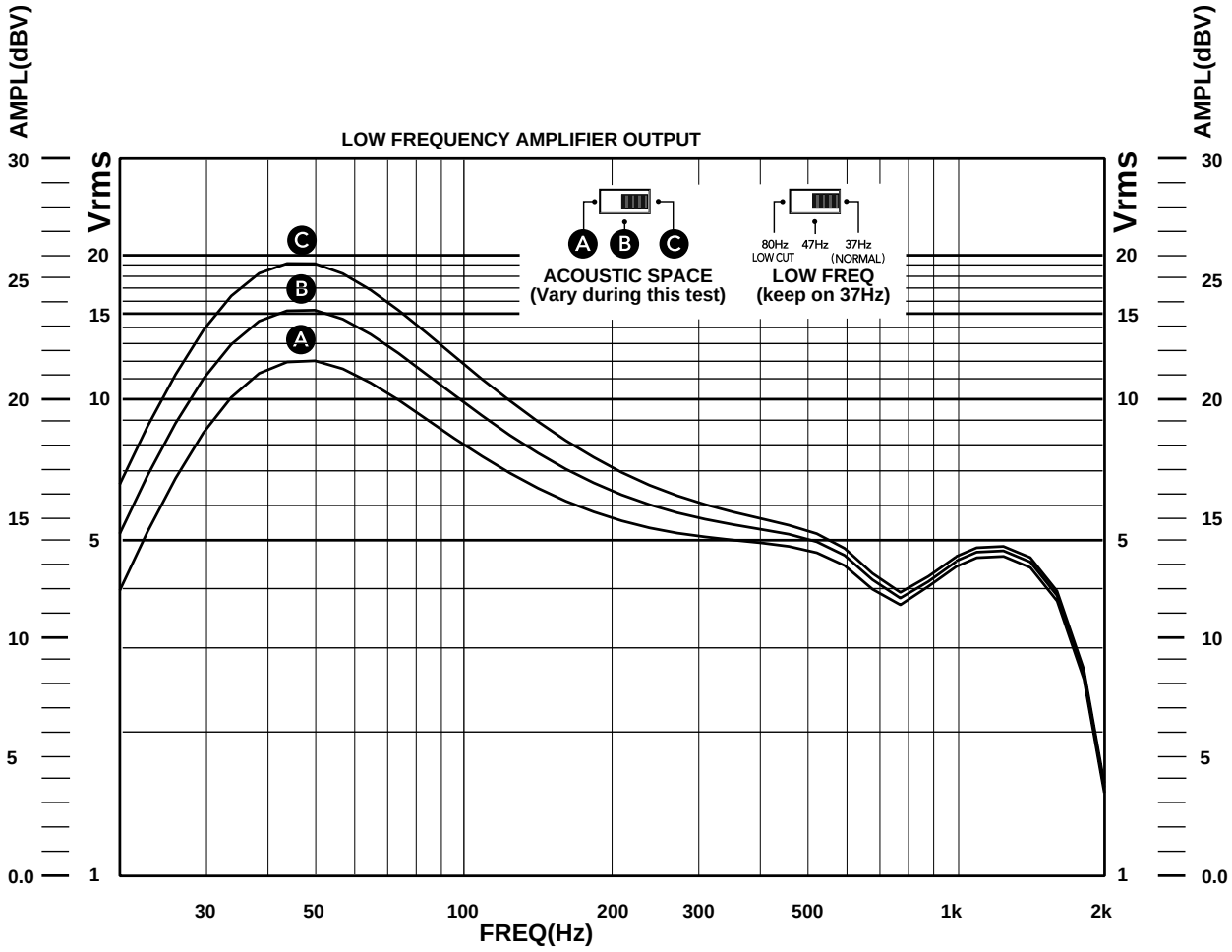
LOW FREQUENCY AMPLIFIER TESTS

ACOUSTIC SPACE SWITCH

Disable the compressor circuit by shorting together pins 1 and 2 of J12.
Turn off the amplifier and connect the two resistor loads as shown on the previous page.
Set all switches to the NORMAL position and turn on the amplifier.
Set your audio signal generator for an output of 300mVrms(-10.46dBV).
Measure the output into the 4 ohm load for the three positions of the ACOUSTIC SPACE switch.
Do these measurements fairly quickly because the amplifier will be warming up.
The level of the output may be different from that shown, due to the factory settings of the calibration pots. Just make sure that the speaker under test follows the overall shape and the switch is working.

THD

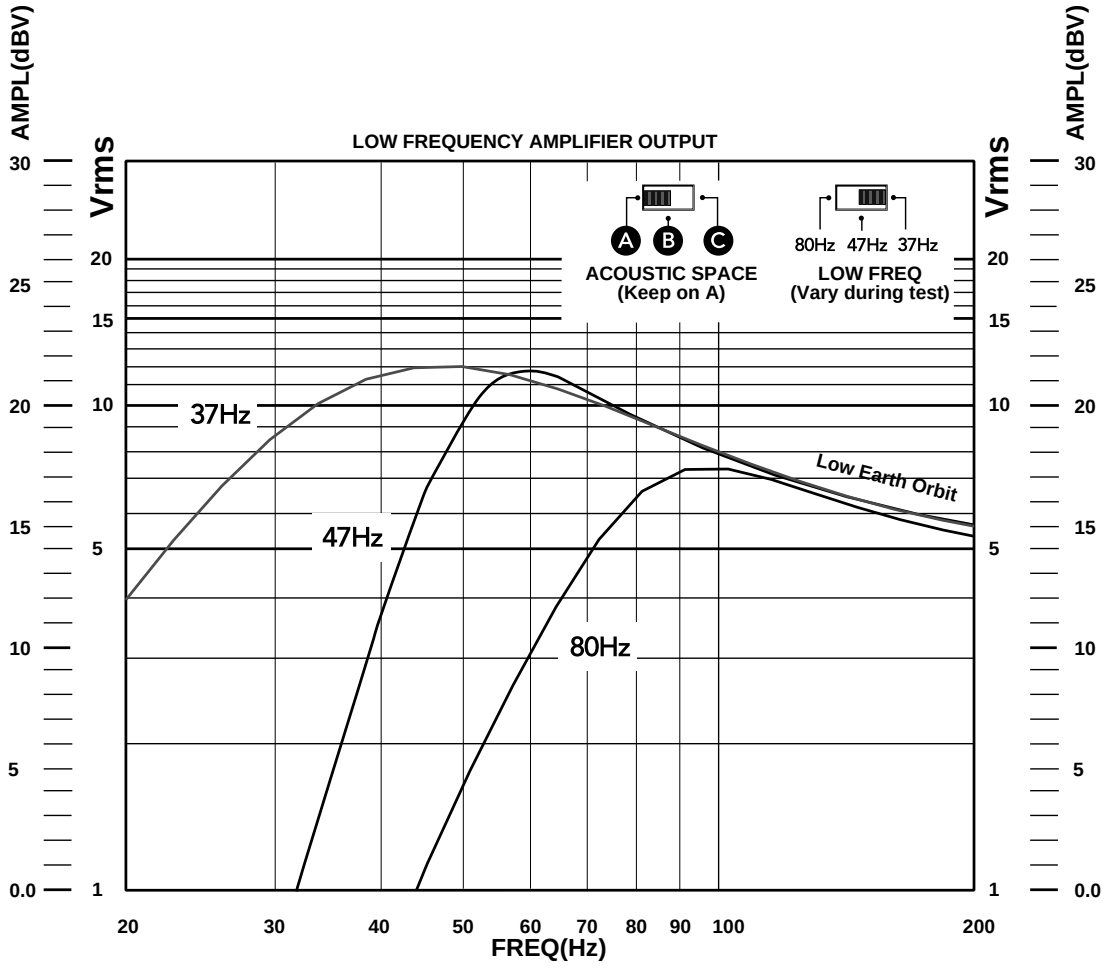
Measure the THD at 400 Hz and verify it is less than 0.1%



LOW FREQUENCY AMP TESTS continued

LOW FREQ SWITCH TEST

Set your audio signal generator for an output of 300mVrms (-10.46dBV)
Set the Acoustic Space switch to position A (Quarter Space).
Measure the output into the 4 ohm load for the three positions of the LOW FREQ switch.
Do these measurements fairly quickly because the amplifier will be warming up.
The level of the output may be different from that shown, due to the factory settings of the calibration pots. Just make sure that the speaker under test follow the overall shapes and the switch is working.
NOTE: the graph of the 37 Hz position is the same as measured on the previous page (position A), so no need to repeat it, just do 47 Hz and 80 Hz.



HIGH FREQUENCY AMPLIFIER TESTS.

NORMAL RESPONSE TEST

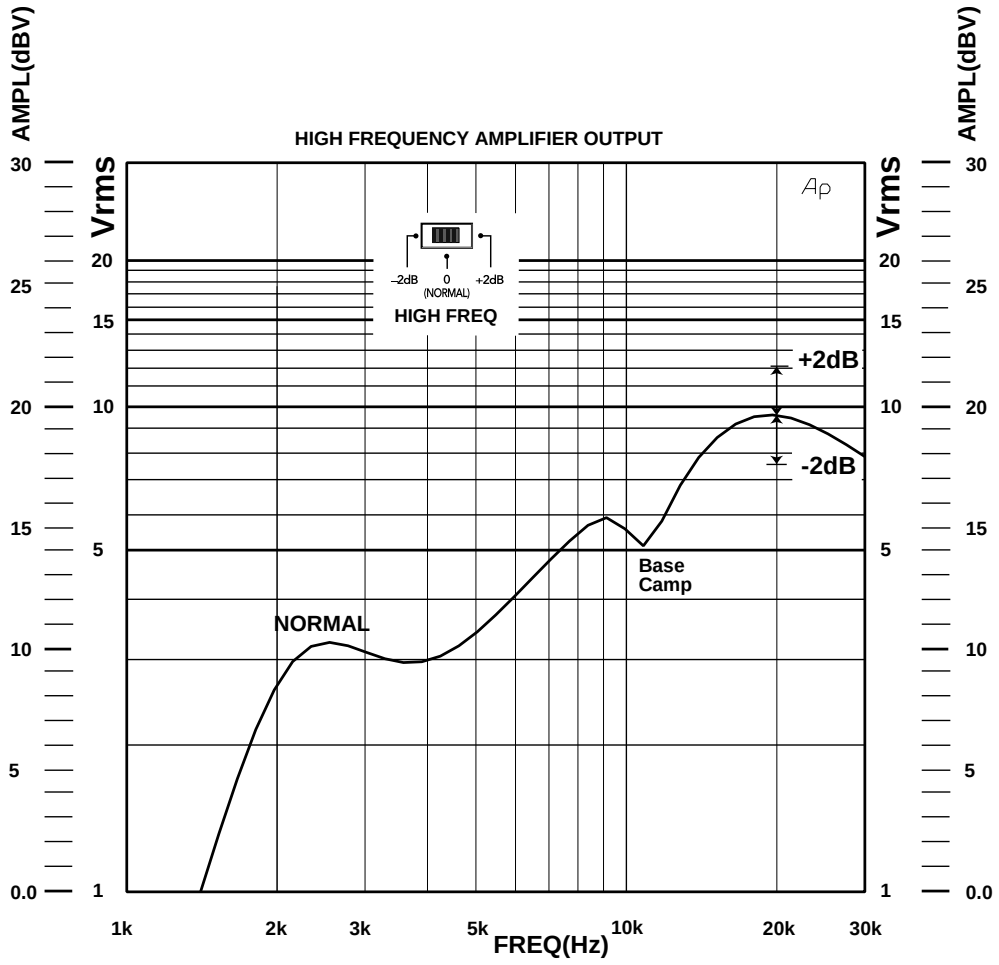
Disable the compressor circuit by shorting together pins 1 and 2 of J12.
Set your audio signal generator for an output of 300mVrms (-10.46dBV)
Set the ACOUSTIC SPACE, LOW FREQ and HIGH FREQ switches to NORMAL.
Do these measurements fairly quickly because the amplifier will be warming up.
The level of the output may be different from that shown, due to the factory settings of the calibration pots. Just make sure that the speaker under test follows the overall shape and that the switch works as follows:

HIGH FREQUENCY SWITCH TEST

Switch the HIGH FREQ switch to +2dB and verify a 2dB increase at 20 kHz.
Switch the HIGH FREQ switch to -2db and verify a 2dB decrease at 20 kHz.

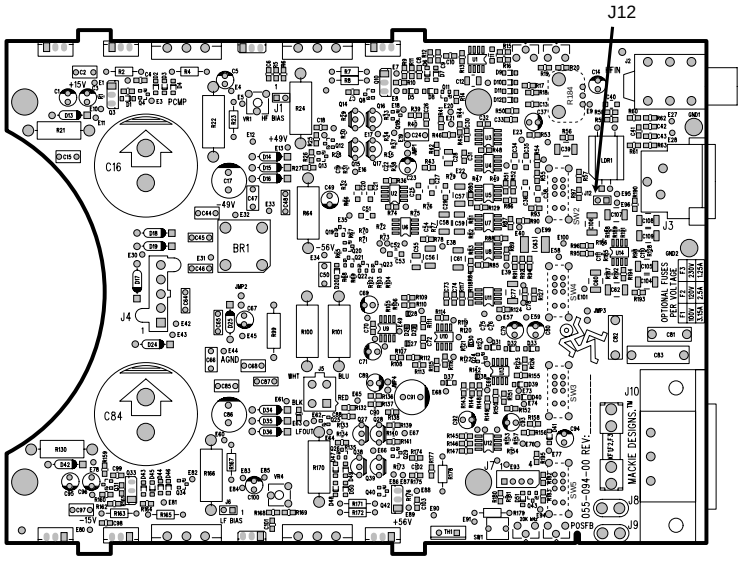
THD

Measure the THD at 3 kHz and verify it is less than 0.1%



POWER TESTS

Disable the compressor circuit by shorting together pins 1 and 2 of J12.
Set all of the switches to NORMAL and measure the output power of both amplifiers into their respective load resistors.
Quickly verify that the output power is as least as follows:
High Frequency amplifier
75 Watts @ 3 kHz into 8 ohms (=24.5 Vrms)
Low Frequency amplifier
110 Watts @ 400 Hz into 4 ohms (=21 Vrms)
Quickly verify that both amplifiers clip symmetrically.
Verify that the OL (overload) LED turns on.
Remove the short from J12 when finished.



WOOFER AND TWEETER TESTS

- Carefully inspect the woofer and tweeter cones for any signs of damage. The speakers do not have front grills, so any cosmetic damage should be easily indentifiable.
- Measure the dc resistance of each driver and verify nothing is shorted. The resistance should be around 6 ohms.
- Carefully and gently check by hand that the woofer moves in and out without any rubbing or scraping of the voice coil.
- Connect the woofer and tweeter to the HR824 amplifier.
- Conduct a listening test and play some low frequency (30 to1kHz) test tones to verify the performance of the woofer driver.
- Sweep from 15 Hz to 110 Hz and listen carefully for any air leaks at front and back. Listen at any screw holes, at the power switch and the leds.
- Tighten any screws, or replace gaskets if required.
- Play some high frequency (2kHz to 20 kHz) tones to check the tweeter. Listen for crystal clear highs, deep bass from two stories down, and the effervescent, detail-revealing openness so beloved by Hi-Fi gurus.

Servere ear/hearing damage can be caused by continous exposure to high level sounds. Take every precaution to preserve your hearing.

PARTS LIST

- When ordering the woofer or tweeter, you must order the bucking magnet as well. Then you will receive the assembly, with the bucking magnet already glued in place.
- Always order the woofer gasket at the same time, because during disassembly, this gasket can get torn. The tweeter gasket (and the small gasket for the LEDs) comes with the woofer gasket.
- Always use the inner box, the outer box and the thin white foam when shipping the HR824 and use all other means of safe-shipping protection. This will protect the finish from getting scuffed up or the woofers from being damaged.
- The assembly diagrams in the fold out sections of this manual also show the part numbers, so check there first for easier parts identification.
- Pages 22-26 show all the parts of the PCB assembly, including two charts of transistor and IC information.

Parts Numbering guide

040-	Cables
055-	Finished PCB Assy
100-	Pots and resistors
200-	Capacitors
300-	Semiconductors
400-	Jacks/Connectors
500-	Switches
510-	Fuses
550-	Chassis Metalwork
600-	Transformers
601-	Inductors
610-	Wires and Cables
640-	AC line cords
700-	Hardware
760-	Knobs/Plastic
770-	Fans
790-	Misc./Packing
800-	Printed Material
860-	EPROM

SAFETY CRITICAL PARTS,
USE EXACT REPLACEMENT
PARTS ONLY.

Final Assembly Parts

PART NO.	DESCRIPTION	QTY	NOTES
080-029-00	PASSIVE RADIATOR ASSEMBLY	1	(ORDER AS A COMPLETE ASSEMBLY)
055-094-00	PCB ASSEMBLY	1	(SEE PAGES 22-24 FOR THE DETAILS)
550-231-00	HEATSINK BRACKET	2	
730-001-00	THERMAL JOINT COMPOUND		(DON'T USE ON THE TRANSISTORS WITH SIL-PADS)
550-228-00	REAR COVER	1	
550-230-00	INTERCONNECT BRACKET	1	(BOTTOM BRACKET)
550-248-00	XFMR PLATE (SPLD W/XFMR)		
600-019-00	XFMR HR824 120V	1	120V UNITS
600-019-01	XFMR HR824 230V	1	230V UNITS
600-019-02	XFMR HR824 100V	1	100V UNITS
700-005-00	SEMS 8-32xl/2 PHP BLKZC	10	FOR REAR PANEL FITTING TO PCB ASSEMBLY
700-030-04	MCH 6-32X3/8 PHP BLKZC	2	FOR IEC CONNECTOR
700-031-02	MCH 6-32X3/8 BTNPIN BLKZC	2	2 FOR GROUND SCREWS
700-052-00	MCH 10-32X2-1/4 PHP BLKZC	1	FOR TRANSFORMER MOUNTING
700-055-00	MCH 4-24X3/8 PHP BLK HILO	2	FOR XLR
705-001-00	KEPNUT 6-32	4	2 FOR IEC, 2 FOR GROUND SCREW
705-011-00	NUT, LOCK 10-32	1	FOR TRANSFORMER SCREW
705-015-00	NUT SLOT NCKL	1	FOR PHONE JACK
710-019-00	WASH FIBRE BLK	1	FOR PHONE JACK
740-001-00	TYRAP 3-1/4L		SEE ASSEMBLY DRAWINGS FOR LOCATIONS
780-107-00	RUBBER WASHER 3.55 DIA	2	FOR TRANSFORMER MOUNTING
080-046-00	CABLE HARNESS ASSEMBLY	1	
611-028-03	WIRE 18GA RED 39 INCH	1	HARNESS ASSEMBLY WIRES
611-029-04	WIRE 18GA BLACK 39 INCH	1	HARNESS ASSEMBLY WIRES
611-041-01	WIRE 18G WHITE 35 INCH	1	HARNESS ASSEMBLY WIRES
611-042-01	WIRE 18G BLUE 35 INCH	1	HARNESS ASSEMBLY WIRES
490-001-00	WOOFER 8.75 INCH 4 OHM	1	
490-003-00	TWEETER 1 INCH 6 OHM	1	
490-010-00	SPEAKER CABINET	1	
490-016-00	BUCKING MAGNET, TWEETER	1	
490-017-00	BUCKING MAGNET, WOOFER	1	
500-016-00	SWITCH ROCKER SPST 6A/250V	1	FRONT POWER SWITCH
551-501-00	CAST WAVE GUIDE	1	
640-001-00	LINECORD IEC SJT 10A/125V 6FT	1	FOR 120 V MODELS
640-002-01	LINECORD, 230V	1	FOR 230 V MODELS
640-002-02	LINECORD, 100V	1	FOR 100 V MODELS
700-010-04	TF 6-32X3/8 PHP BLKZC	5	(4 TWEETER SCREWS AND 1 FOR LED)
701-012-05	SCREW SM 8xl PAN TORX BLKOX	17	(9 WAVEGUIDE, 2 PASSIVE RAD, 6 REAR PANEL)
710-005-00	WASHER INT STAR NO.6 BLK	5	(4 TWEETER SCREWS AND 1 FOR LED)
730-019-00	ACCEL BLACK MAGIC 737		(FOR FOAM)
750-002-00	BUMPON FLT RND BLK .14H	4	
780-102-00	GASKET FOR WAVEGUIDE	1	
780-103-00	GASKET FOR WOOFER	1	(INCLUDES TWEETER AND LED GASKET)
780-110-00	GASKET FOR PASSIVE RADIATOR	1	
790-019-00	P/FOAM 48X28X1/32 P/F SHT		PACKING FOAM "THE WHITE STUFF"
800-067-00	BOX INNER - HR824	1	
800-068-00	BOX OUTER - HR824	1	
810-050-00	FOAM CABINET HR824	1	
810-052-00	FOAM TWEETER HR824	1	
810-058-00	INST CORNER - HR824	8	
810-059-00	INST COLLAR - HR824	1	
810-060-00	INST COLLAR 2 - HR824	1	
840-074-00	LBL MACKIE LOGO 3D	1	

PCB Assy 055-094-00 Rev A and B (A/B differences marked in bold print)

PART NO.	DESCRIPTION			REFERENCE DESIGNATORS
040-127-00	DIS 22GA BLK 1C 2.SIN QD			
400-091-00	TERM ODISC .187 F 18-22GA			
610-012-00	WIR 22GA 1007 BLK 2.5 ST2			
040-135-00	DIS 18G 1010 GRNYL 4 LGTM			
400-172-00	TERM SOLDER-IN 18AWG			
611-038-00	WIR 18GA 1010 GN/YL 4 ST2			
711-001-00	LUG NO.6 SOLDER STAR			
110-065-00	RESISTOR CF, 1/4 WATT	4K7	5%	R179
110-083-00	RESISTOR CF, 1/4 WATT	27K	5%	R178
120-097-00	RESISTOR CF, 1/2 WATT	10K	5%	R99
121-081-00	RESISTOR MF, 1WATT	2K2	5%	R21 R130
123-001-00	RESISTOR MF, 3WATT	.1 OHM	5%	R101
123-009-00	RESISTOR MOF, 3WATT	.22	5%	R22 R24 R166 R170
123-049-00	RESISTOR MOF, 3WATT	10	5%	R64 R100
130-038-00	RES POT TRIM HORIZ	500-B		VR1 VR4
130-043-02	RES POT 9MM HORIZ	10KA		R184
130-044-00	RES POT TRIM VERT	500-B		VR6 **VR5 (REV A)**
130-046-00	RES POT TRIM VERT	1K		**VR5 (REV B)**
130-046-00	RES POT TRIM VERT	1K		VR3
130-052-00	RES POT TRIM VERT	50K		VR2
140-041-00	RESISTOR TF SMT	47	5%	R146
140-053-00	RESISTOR TF SMT	150	5%	R25 R40 R161 R173
140-057-00	RESISTOR TF SMT	220	5%	R3 R9 R162 R175
140-060-00	RESISTOR TF SMT	300	5%	R28 R37 R131 R133 R139
140-065-00	RESISTOR TF SMT	470	5%	R77
140-070-00	RESISTOR TF SMT	750	5%	R6 R90 R168
140-073-00	RESISTOR TF SMT	1K0	5%	R122 R148-149
140-080-00	RESISTOR TF SMT	2K	5%	R20
140-082-00	RESISTOR TF SMT	2K4	5%	R19 R155
140-096-00	RESISTOR TF SMT	9K1	5%	R15
140-097-00	RESISTOR TF SMT	10K	5%	R123
140-104-00	RESISTOR TF SMT	20K	5%	R126
140-109-00	RESISTOR TF SMT	30K	5%	R1 R10 R160 R177
140-123-00	RESISTOR TF SMT	100K	5%	R111 R116 R125
145-162-00	RESISTOR MF SMT	47R5	1%	R29-30 R33-34 R59 R74 R79 R134-135 R140-141
145-193-00	RESISTOR MF SMT	100	1%	R62-63 R158
145-204-00	RESISTOR MF SMT	130	1%	R80
145-226-00	RESISTOR MF SMT	221	1%	R157
145-239-00	RESISTOR MF SMT	301	1%	R67 R71 R103-104
145-269-00	RESISTOR MF SMT	619	1%	R32
145-285-00	RESISTOR MF SMT	909	1%	R124
145-289-00	RESISTOR MF SMT	1K00	1%	R35 R49 R95 R137
145-293-00	RESISTOR MF SMT	1K10	1%	R118 **R73 (REV A)**
145-294-00	RESISTOR MF SMT	1K13	1%	R96
145-300-00	RESISTOR MF SMT	1K30	1%	**R73 (REV B)**
145-306-00	RESISTOR MF SMT	1K50	1%	R75 R138
145-314-00	RESISTOR MF SMT	1K82	1%	R14 R43 R47 R70 R102 R195
145-326-00	RESISTOR MF SMT	2K21	1%	R5 R169
145-331-00	RESISTOR MF SMT	2K49	1%	R11 R26-27 R39 R53 R119 R159 R164 R174 R176
145-338-00	RESISTOR MF SMT	2K94	1%	R55 R97
145-339-00	RESISTOR MF SMT	3K01	1%	R13
145-346-00	RESISTOR MF SMT	3K57	1%	R94
145-354-00	RESISTOR MF SMT	4K32	1%	R84

PART NO.	DESCRIPTION			REFERENCE DESIGNATORS
145-358-00	RESISTOR MF SMT	4K75	1%	R44-45 R66 R85 R87 R98 R121 R128 R185-186
145-361-00	RESISTOR MF SMT	5K11	1%	R16-17 R60-61 R145
145-367-00	RESISTOR MF SMT	5K90	1%	R57
145-381-00	RESISTOR MF SMT	8K25	1%	R41 R51 R113
145-383-00	RESISTOR MF SMT	8K66	1%	R193
145-389-00	RESISTOR MF SMT	10K0	1%	R42 R86 R89 R91-92 R109 R115 R153 R183 **R46 (REV A)**
145-393-00	RESISTOR MF SMT	11K0	1%	R190
145-397-00	RESISTOR MF SMT	12K1	1%	R36 R52 **R46 (REV B)**
145-406-00	RESISTOR MF SMT	15K0	1%	R18 R50 R78 R110 R112
145-409-00	RESISTOR MF SMT	16K2	1%	R82
145-411-00	RESISTOR MF SMT	16K9	1%	R187
145-414-00	RESISTOR MF SMT	18K2	1%	R58
145-415-00	RESISTOR MF SMT	18K7	1%	R188
145-418-00	RESISTOR MF SMT	20K0	1%	R31 R38 R54 R56 R65 R68-69 R72 R106 R114 R120 R132 R136
145-422-00	RESISTOR MF SMT	22K1	1%	R143 R151
145-424-00	RESISTOR MF SMT	23K2	1%	R192
145-426-00	RESISTOR MF SMT	24K3	1%	R129
145-435-00	RESISTOR MF SMT	30K1	1%	R76
145-437-00	RESISTOR MF SMT	31K6	1%	R189
145-439-00	RESISTOR MF SMT	33K2	1%	R181
145-452-00	RESISTOR MF SMT	45K3	1%	R194
145-454-00	RESISTOR MF SMT	47K5	1%	R142 R144 R150 R180
145-472-00	RESISTOR MF SMT	73K2	1%	R191
145-473-00	RESISTOR MF SMT	75K0	1%	R83
145-479-00	RESISTOR MF SMT	86K6	1%	R81
145-480-00	RESISTOR MF SMT	88K7	1%	R117 R127
145-485-00	RESISTOR MF SMT	100K	1%	R105 R152 R154
145-500-00	RESISTOR MF SMT	143K	1%	R12
145-510-00	RESISTOR MF SMT	182K	1%	R48
145-518-00	RESISTOR MF SMT	221K	1%	R93 R147 R156
145-522-00	RESISTOR MF SMT	243K	1%	R107
145-553-00	RESISTOR MF SMT	511K	1%	R88 R108
145-581-00	RESISTOR MF SMT	1M0	1%	R182
150-009-00	RES, FUSIBLE, 1/4W	2.2	5%	R4 R7 R165 R171
150-037-00	RES, FUSIBLE, 1/4W	33	5%	R2 R8 R163 R172
150-045-00	RES, FUSIBLE, 1/4W	68	5%	R23 R167
200-023-00	CAP, POLY BOX, 250 V	.001uF	20%	C81-82
200-024-00	CAP, POLY BOX, 250 V	.01uF	20%	C83
200-027-02	CAP MYLAR T&R	.1	5%	C2 C15 C24 C44 C47 C50 C66 C68 C85 C97
200-028-02	CAP MYLAR T&R	.01	5%	C45-46 C64-65
200-037-02	CAP MYLAR T&R	.033	5%	C48 C87
212-001-00	CAP CERAMIC SMT	.01	10%	C6 C8-10 C32 C70 C72 C75-76 C101
212-003-00	CAP CERAMIC SMT	100P	5%	C13 C33
212-014-00	CAP CERAMIC SMT	180PF	5%	C4 C7 C98 C103
212-019-00	CAP CERAMIC SMT	150PF	5%	C30 C54 C110-111
212-020-00	CAP CERAMIC SMT	750PF		C18 C26 C99 C102
212-021-00	CAP CERAMIC SMT	27pF		C19 C88
212-023-00	CAP CERAMIC SMT	.001	10%	C22 C41-43 C90
220-001-02	CAP LYTIC RADIAL TAPE	22UF	10%	C69 C71
220-002-02	CAP LYTIC RADIAL TAPE	47UF	10%	C14 C37 C89 C93-94
220-005-02	CAP LYTIC RADIAL TAPE	470UF	10%	C17 C86
220-012-02	CAP LYTIC RADIAL TAPE	4.7UF	10%	C49 C79
220-027-02	CAP LYTIC RADIAL TAPE	10UF	10%	C1 C3 C5 C23 C67 C80 C92 C95-96 C100
220-030-00	CAP LYTIC RADIAL	1000UF	10%	C91
220-036-00	CAP LYTIC RADIAL	10,000UF	20%	C16 C84

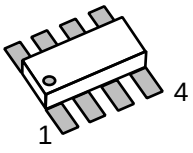
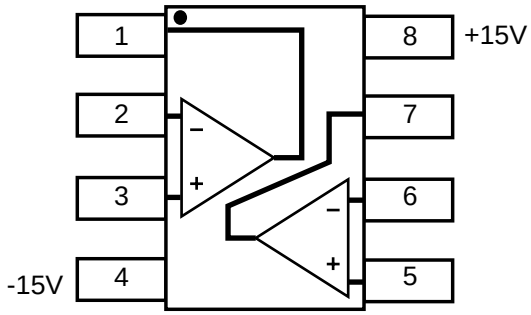
FUSIBLE RESISTORS

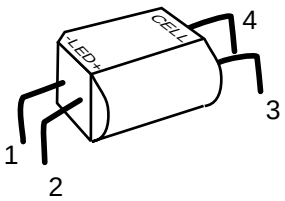
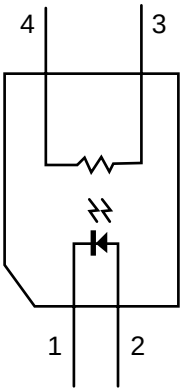
PRIMARY CIRCUIT CAPS

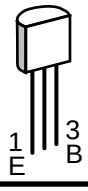
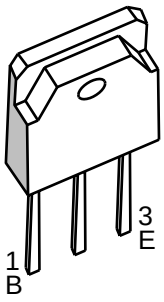
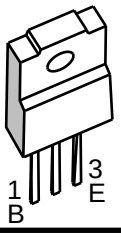
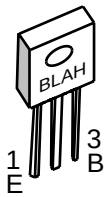
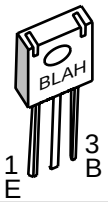
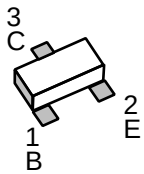
PART NO.	DESCRIPTION			REFERENCE DESIGNATORS
224-004-00	CAP FILM SMT	.0022	2.0%	C31
224-006-00	CAP FILM SMT	.0047	2.0%	C11 C34 C38 C40
224-007-00	CAP FILM SMT	.0068	2.0%	C35 C53
224-009-00	CAP FILM SMT	.01	2.0%	C20-21 C25 C27 C29 C36 C51
224-010-00	CAP FILM SMT	.1	2.0%	C39 C56-60 C62 C104-109
224-011-00	CAP FILM SMT	.022	2.0%	C12 C55
224-014-00	CAP FILM SMT	.033	2.0%	C28
224-015-00	CAP FILM SMT	.047	2.0%	C77
224-016-00	CAP FILM SMT	470pf	2.0%	C52 C78
224-017-00	CAP FILM SMT	.0015	2.0%	C73-74
224-019-00	CAP FILM SMT	.15	5%	C61
224-020-00	CAP FILM SMT	.39	5%	C63
300-003-00	DIODE SIGNAL SMD	DL4148		D1-12 D20-21 D26-33 D37-41 D43-51
301-009-00	DIODE POWER	1N4004		D14-19 D24-25 D34-36
301-013-00	DIODE BRIDGE	6A		BR1
302-003-00	DIODE ZENER	1N4745		D13 D42
304-001-00	DIODE LED T1	RED		D22-23
310-023-02	TRANSISTOR NPN T&R	2SC2362K		Q14-15 Q28 Q39
310-024-00	TRANSISTOR PNP	2SB817		Q7 Q35
310-025-00	TRANSISTOR NPN	2SD1047		Q5 Q37
310-028-00	TRANSISTOR PNP	2SB940A		Q9 Q30 Q32
310-029-00	TRANSISTOR NPN	2SD1264A		Q1-2 Q41
310-032-02	TRANSISTOR PNP T&R	2SA1016K		Q16-17 Q27 Q38
310-035-00	TRANSISTOR PNP	2SA1478		Q3 Q42
310-036-00	TRANSISTOR NPN	2SC3788		Q10 Q33
310-037-00	TRANSISTOR NPN	MJE340		Q6 Q36
311-001-00	X-SISTOR NPN SMD	IMBT4401		Q19-20 Q43
311-002-00	X-SISTOR PNP SMD	IMBT4403		Q21-23
311-005-00	X-SISTOR NPN SMD	IMBTA06		Q8 Q11-12 Q24 Q29 Q31 Q34
311-006-00	X-SISTOR PNP SMD	IMBTA56		Q4 Q13 Q18 Q25-26 Q40
320-004-00	I.C. LINEAR SMD	NJM4560		U1-14
329-012-00	OPTO-ISOLATOR,LED/CDS	VTL5C10		LDR1
400-060-00	FUSE CLIP PCMT			Z1 Z3
400-131-00	CON XLR PC MTG HORIZ FML SML			J3
400-132-00	CONNECTOR, IEC, RIGHT ANGLE,			J10 PC MT
400-163-00	HDR, VERT, 4P, .165X2, M,			J5 W/PEGS
400-165-00	HDR ,VERT, 5P, .165X1, M ,			J4 W/PEGS
400-166-00	CONNECTOR, STEREO, JACK 1/4"			J2 HORIZ SLIM
400-171-00	CONN, HDR, 2-PIN, UN-SHROUDED,			J1 J6 J12 0 .100
400-173-00	CONN QUICK DISC .250			J8-9 W/STABLE-LOK TABS
400-178-00	CONNECTOR,STR,4P,.098 X 1,SHRD			J7 J11
410-004-00	SIL PAD, TO-126			Z12-13 (FOR SMALL TRANSISTORS)
410-005-00	SIL PAD, TO-220			Z14-17 (FOR LARGE TRANSISTORS)
450-094-00	PCB, MONITOR			Z2
500-025-00	SWITCH, SLIDE, 2P3T			SW2-5
500-026-00	THERMOSTAT	67F070		TH1
500-033-02	SWITCH, TACT 6MM SQR 260GF	SPST		SW1
550-231-00	HEATSINK BRACKET			Z4-5
700-023-00	SCREW, PHP, BLK, 6-32X1/2			Z30 Z59 (FOR IEC SOCKET)
700-028-00	SCREW, PHP, BLK, 6-32X1/4 SEMS			Z6-7 Z10-11 (MOUNTING BOARD)
700-058-03	SCREW, SKT HD, 4-40X5/8			Z8-9 Z18-28 (FOR TRANSISTORS)
705-001-00	NUT, KEP, 6-32			Z60-61 (FOR IEC SOCKET)
705-016-00	NUT, 4-40			Z31-38 Z43 Z96-99 (FOR TRANSISTORS)
706-044-00	SPACER, LED .440			Z44-45 (FOR LED)

PART NO.	DESCRIPTION		REFERENCE DESIGNATORS	
710-020-00	WASHER, COMPRESSION		Z46-58	(FOR TRANSISTORS)
710-022-00	WASHER, FLAT		Z62-74	(FOR TRANSISTORS)
730-003-00	ADHESIVE, 3M 4799			
730-025-00	LOCKTITE 222			
510-025-00	FUSE SB 1.25A 5X20 250V UL	1	230V UNITS	
510-026-00	FUSE SB 3.15A 5X20 250V UL	1	100V UNITS	FUSES
510-029-00	FUSE SB 2.5A 5X20 250V UL	1	120V UNITS	
780-043-00	INSULATOR PCB	1	(FITS ON PCB)	
712-038-00	RIVET NYLON .123-.127HOLE	1	(FOR PCB INSULATOR)	
400-135-00	TERM 11A/600V F 18-20GA	5		
400-164-00	5P .165X1 F VERT	1		
400-210-00	TERM QDISC .250 F 18-22GA	2		

IC and Transistor charts

STYLE	REF DESIG.	PART NUMBER	DESCRIPTION
	U1-14	320-004-00	NJM4560 DUAL OP AMP
			

STYLE	REF DESIG.	PART NUMBER	DESCRIPTION
	LDR1	329-012-00	VTL5C10 OPTO ISOLATOR
			

STYLE	REF DESIG.	PART NUMBER	DESCRIPTION	TYPE
	Q14,15,28,39	310-023-02	2SC2362K	NPN
	Q16,17,27,38	310-032-02	2SA1016K	PNP
	Q5, Q37	310-025-00	2SD1047	NPN
	Q7, Q35	310-024-00	2SB817	PNP
	Q1, Q2, Q41	310-029-00	2SD1264A	NPN
	Q9, Q30, Q32	310-028-00	2SB940A	PNP
	Q6, Q36	310-037-00	MJE340	NPN
	Q10, Q33	310-036-00	2SC3788	NPN
	Q3, Q42	310-035-00	2SA1478	PNP
	Q19, Q20, Q43	311-001-00	IMBT4401	NPN
	Q21, Q22, Q23	310-002-00	IMBT4403	PNP
	Q8, Q11, 12, 24, Q29, Q31, Q34	310-005-00	IMBTA06	NPN
	Q4, Q13, Q18, Q25, Q26, Q40	310-006-00	IMBTA56	PNP

DWG. NO.	SHT	REV:
990-094-00	1	B

ECO#	REV:	DESCRIPTION	REV. BY:	APP. BY:	DATE
1151	B	CHANGED TO 400-173-00 (REV:9)	TH		6-30-98
1305		CHANGED VALUES R18, R5, R23, R19 (REV:9)			
1313		R46 WAS 10K0			
1348		VR5 WAS 130-044-00			
1359		4560M WAS 4560			
1360		LED WAS HL LED AND SPACER			
1382		CREATED NEW SUBASSYS			
1404		R73 WAS 1K10			
1683		MODIFIED FILM CAP DECALS			
1704		REMOVED SIL PADS			
1801		REMOVED BRACKET, ON FINAL ASSY			
1968		MODIFIED FUSE SILKSCREEN AND CABLE ASSY			

* Note: The only difference between the Rev A and Rev B parts are that VR5, R73 and R46 may have different values on the Rev A board. See the parts list for details. (There is no need to change to the new parts if you have a Rev A board).

WAVEGUIDE PCB

POWER

LOW FREQUENCY DETECTION

HIGH FREQUENCY DETECTION

HF CROSSOVER

20 kHz BOOST

HF LEVEL

10.74 kHz CUT

3.77 kHz CUT

2.2K Hz FILTER

BP FILTER

HP FILTER

LF CROSSOVER

ACOUSTIC SPACE

INPUT SENSITIVITY

LF GAIN TRIM

FEEDBACK

450-094-00	PCB, MONITOR	
400-060-00	FUSE CLIP PCMT	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS: ±NA DECIMALS: .XX ±.01 ANGLES: ±NA .XXX ±.005	APPROVALS	DATE
MATERIAL: SEE NOTES	DRAWN: th	4-25-97
FINISH: SEE NOTES	CHECKED: jh	7-31-97
DO NOT SCALE DRAWING	NP ENG: DUKE AGUIAR	2-27-97
	MATERIAL: rwk	8-1-97
	MFG: pb	8-1-97
	MFG ENG: jwp	7-31-97
	ISSUED: lv	8-1-97

MACKIE. Mackie Designs Inc. Woodinville, Wa.

SCHEMATIC, STUDIO MONITOR

SIZE	SCALE:	DWG. NO.	REV.
D	NONE	990-094-00	B

DWG FILE: SHEET 1 OF 2

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DWG. NO.	SHT	REV:
990-094-00	1	B

ECO#	REV:	DESCRIPTION	REV. BY:	APP. BY:	DATE

HF AMP OUTPUT

HF WIRING:

HFOUT
E33
J5-4 (WHT) HF- (UNMARKED)
J5-3 (BLU) HF+ (+)

HF BIAS

LF AMP OUTPUT

LFOUT
E63
J5-1 (RED) LF + (RED DOT)
J5-2 (BLK) LF- (UNMARKED)
POSFB
E61

LF BIAS

LF WIRING:

NOTE: OPTIONAL FUSES AT THIS ASSEMBLY LEVEL IN QUESTION. TBD PRIOR TO RELEASE OF REV:A

100V	F1	510-026-00 FUSE, 3.15A, 5X20MM
120V	F2	510-012-00 FUSE,2.5A,5X20MM 120V
230V	F3	510-025-00 FUSE,1.25,5X20MM 230V

UNLESS OTHERWISE SPECIFIED	APPROVALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN: j.groth	4-25-97
TOLERANCES ARE: FRACTIONS: ±NA DECIMALS: .XX ±.01 ANGLES: ±NA .XXX ±.005	CHECKED:	
MATERIAL: SEE NOTES	NP ENG: DUKE AGUIAR	2-27-97
FINISH: SEE NOTES	MATERIAL:	
DO NOT SCALE DRAWING	MFG:	
	MFG ENG:	
	ISSUED:	

Mackie Designs Inc. Woodinville, Wa.

SCHEMATIC, STUDIO MONITOR

SIZE	SCALE:	DWG. NO.	REV.
D	NONE	990-094-00	B

DWG FILE: SHEET 2 OF 2

A-2 HR824 SCHEMATIC REV A and B sheet 2 of 2

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310-029-00
NPN
2SD1264A
Q1

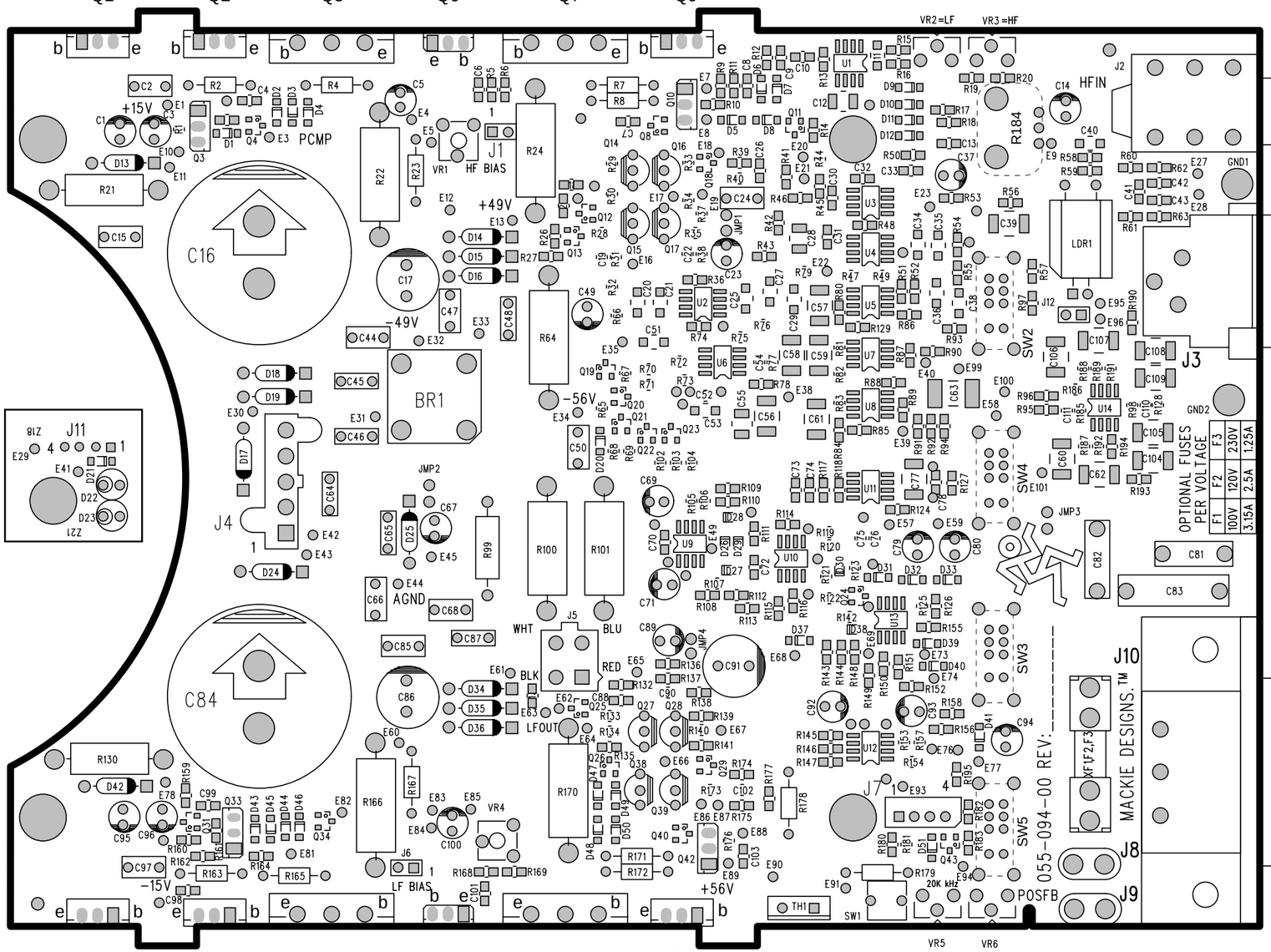
310-029-00
NPN
2SD1264A
Q2

310-025-00
NPN
2SD1047
Q5

310-037-00
NPN
MJE340
Q6

310-024-00
PNP
2SB817
Q7

310-028-00
PNP
2SB940A
Q9



J2
1/4" STEREO JACK
400-166-00

J3
XLR (FEMALE)
CONNECTOR
400-131-00

J10
IEC CONNECTOR
400-132-00

Q30
2SB940A
PNP
310-028-00

Q32
2SB940A
PNP
310-028-00

Q35
2SB817
PNP
310-024-00

Q36
MJE340
NPN
310-037-00

Q37
2SD1047
NPN
310-025-00

Q41
2SD1264A
NPN
310-029-00

TH1
67F070
THERMOSTAT
500-026-00

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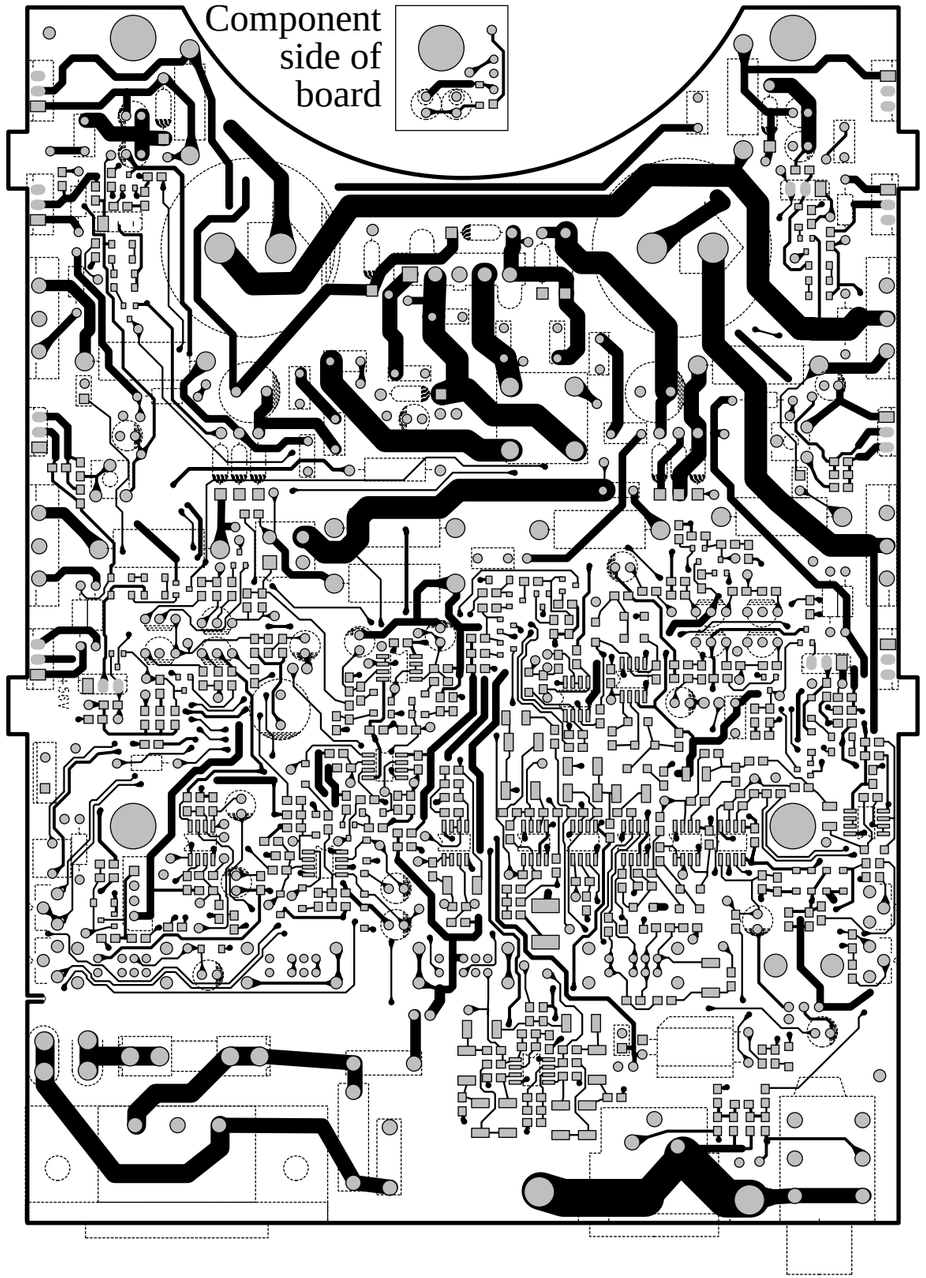

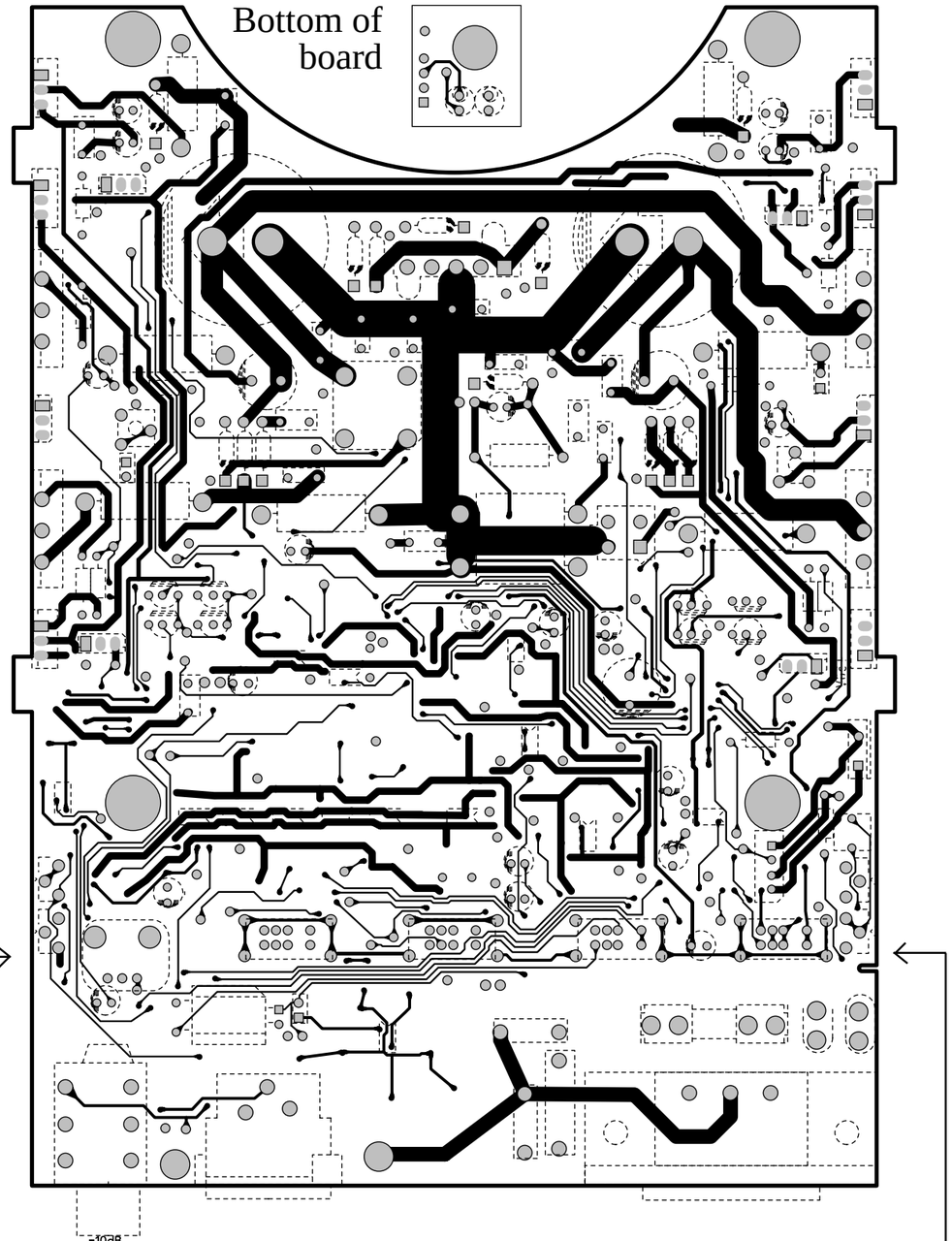

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310-029-00
NPN
2SD1264A
Q1

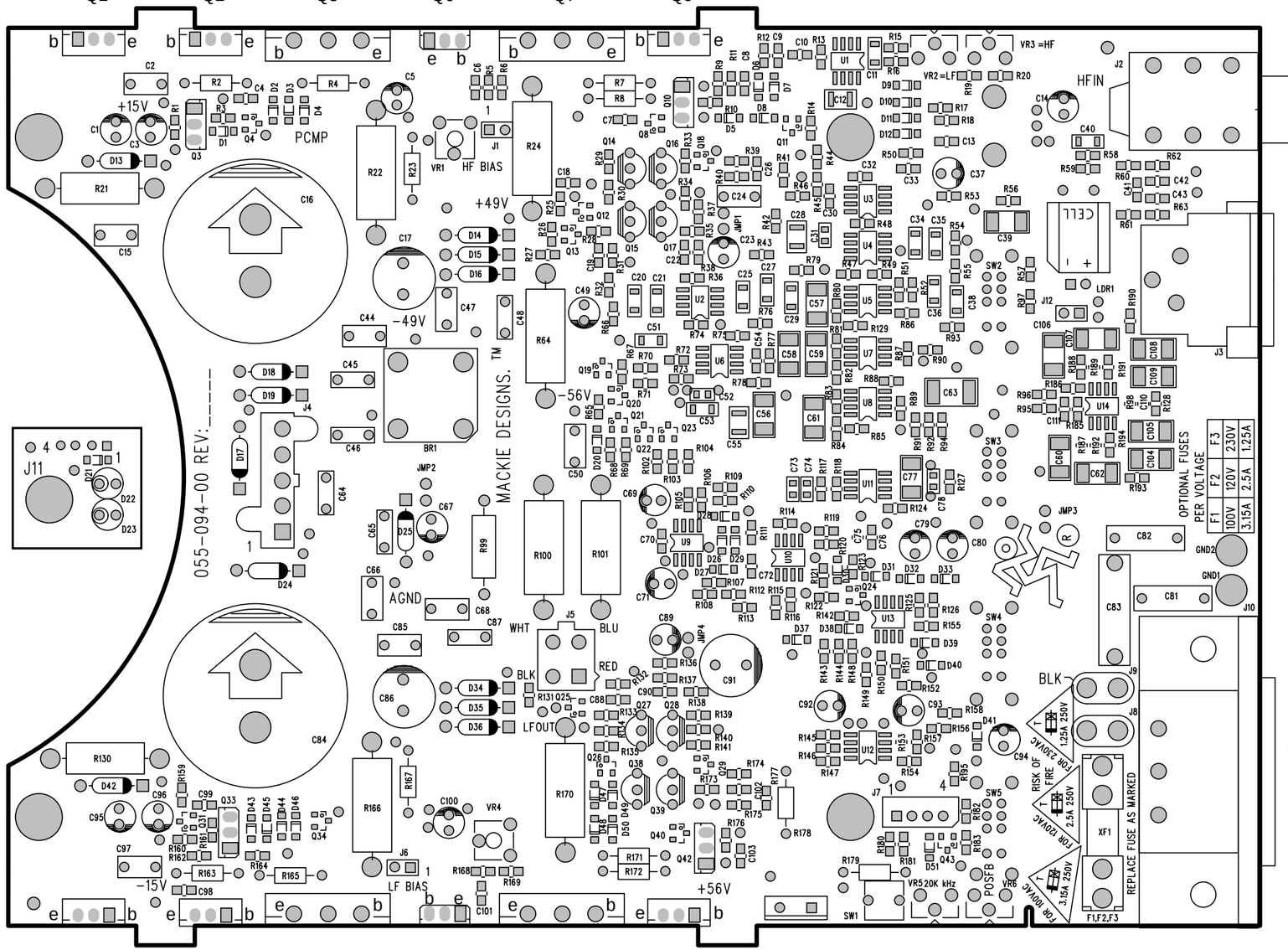
310-029-00
NPN
2SD1264A
Q2

310-025-00
NPN
2SD1047
Q5

310-037-00
NPN
MJE340
Q6

310-024-00
PNP
2SB817
Q7

310-028-00
PNP
2SB940A
Q9



J2
1/4" STEREO JACK
400-166-00

J3
XLR (FEMALE)
CONNECTOR
400-131-00

J10
IEC CONNECTOR
400-132-00

Note: The main difference between the Rev A and Rev B boards is in the trace layout at this end of the board

Q30
2SB940A
PNP
310-028-00

Q32
2SB940A
PNP
310-028-00

Q35
2SB817
PNP
310-024-00

Q36
MJE340
NPN
310-037-00

Q37
2SD1047
NPN
310-025-00

Q41
2SD1264A
NPN
310-029-00

TH1
67F070
THERMOSTAT
500-026-00

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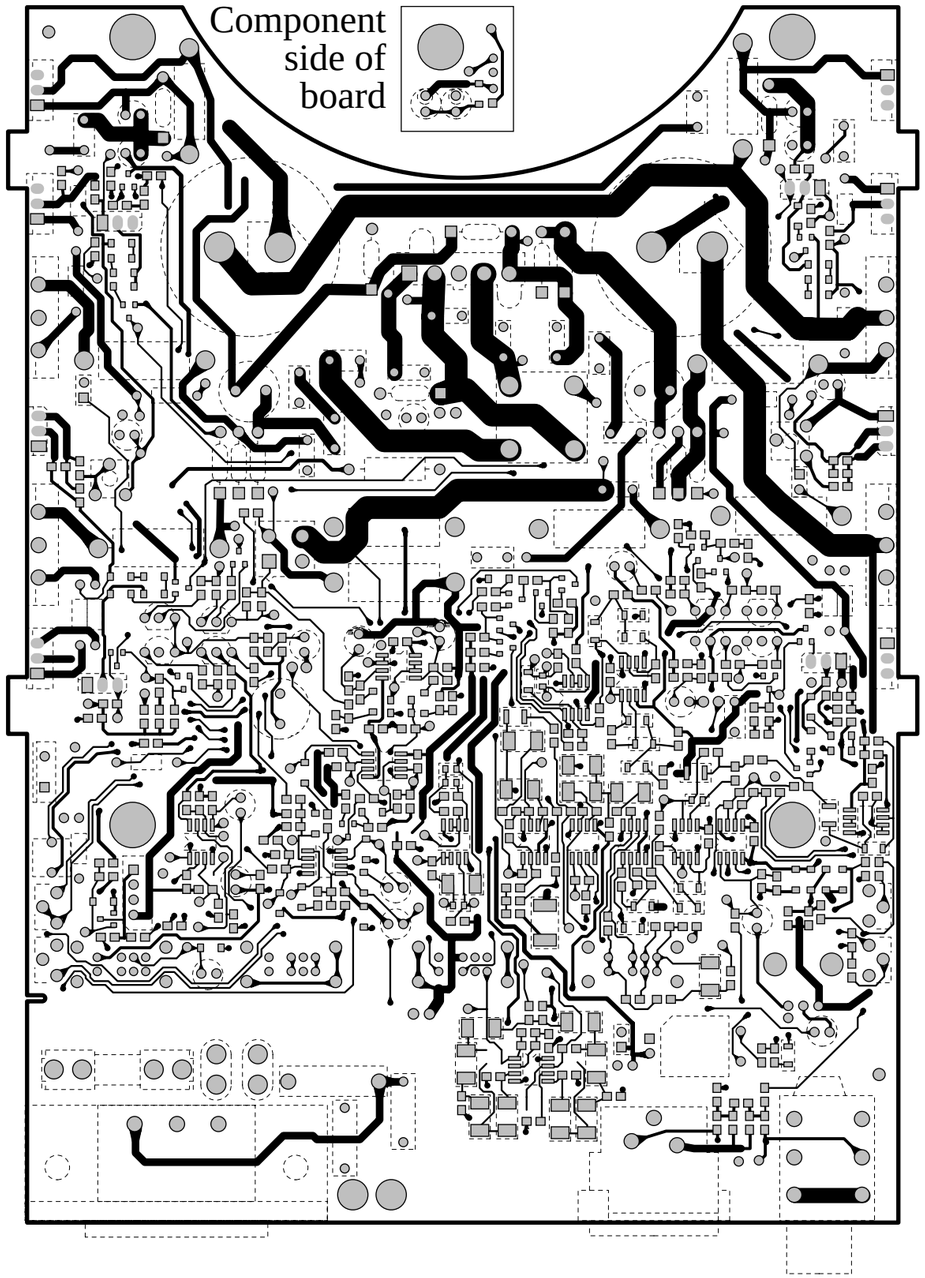

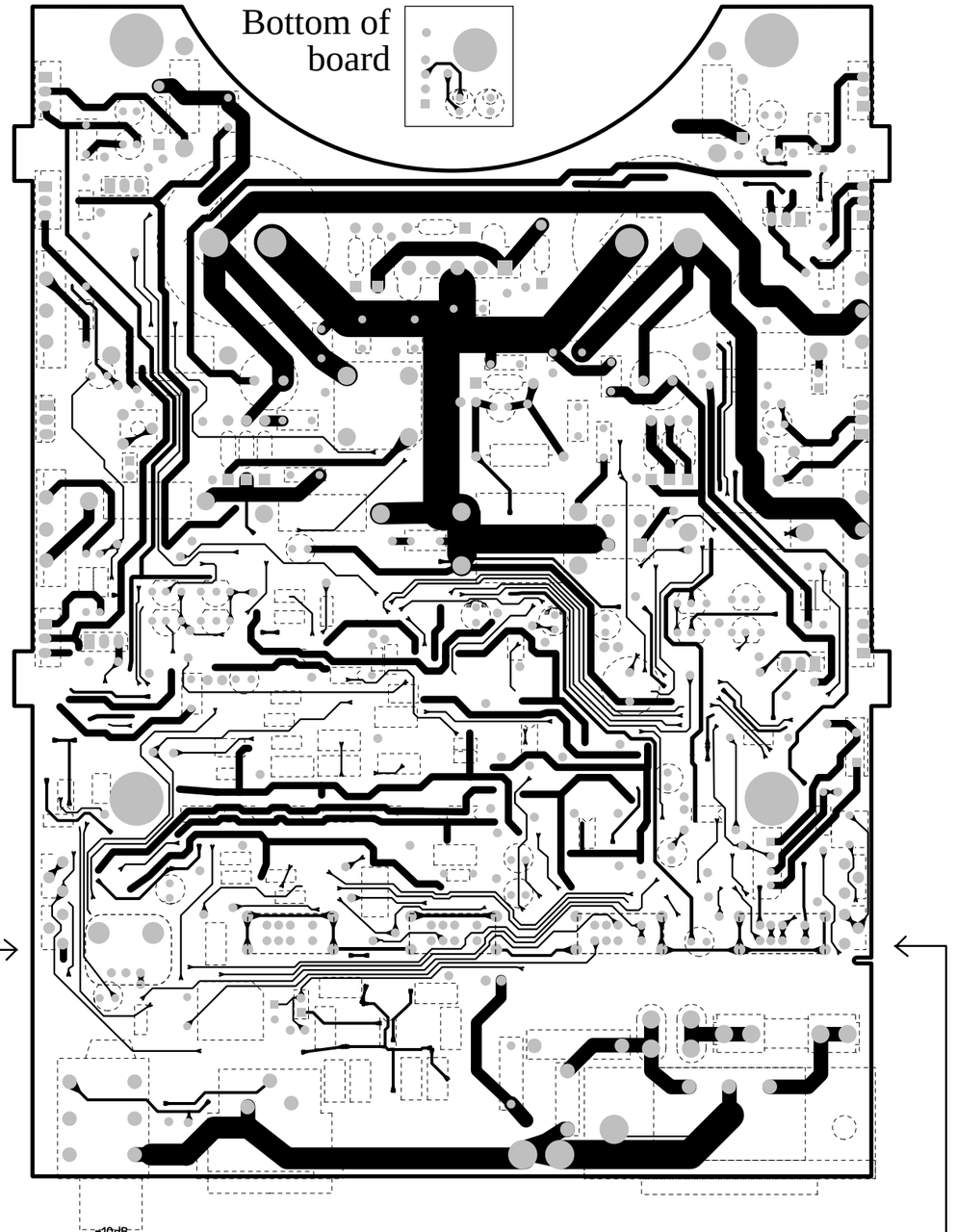

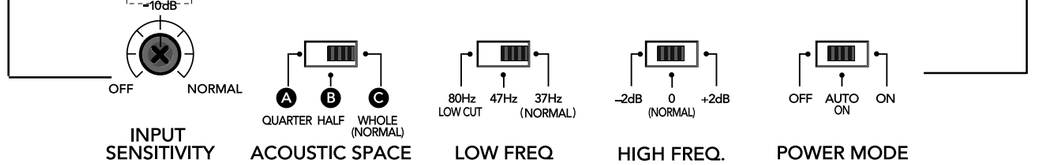

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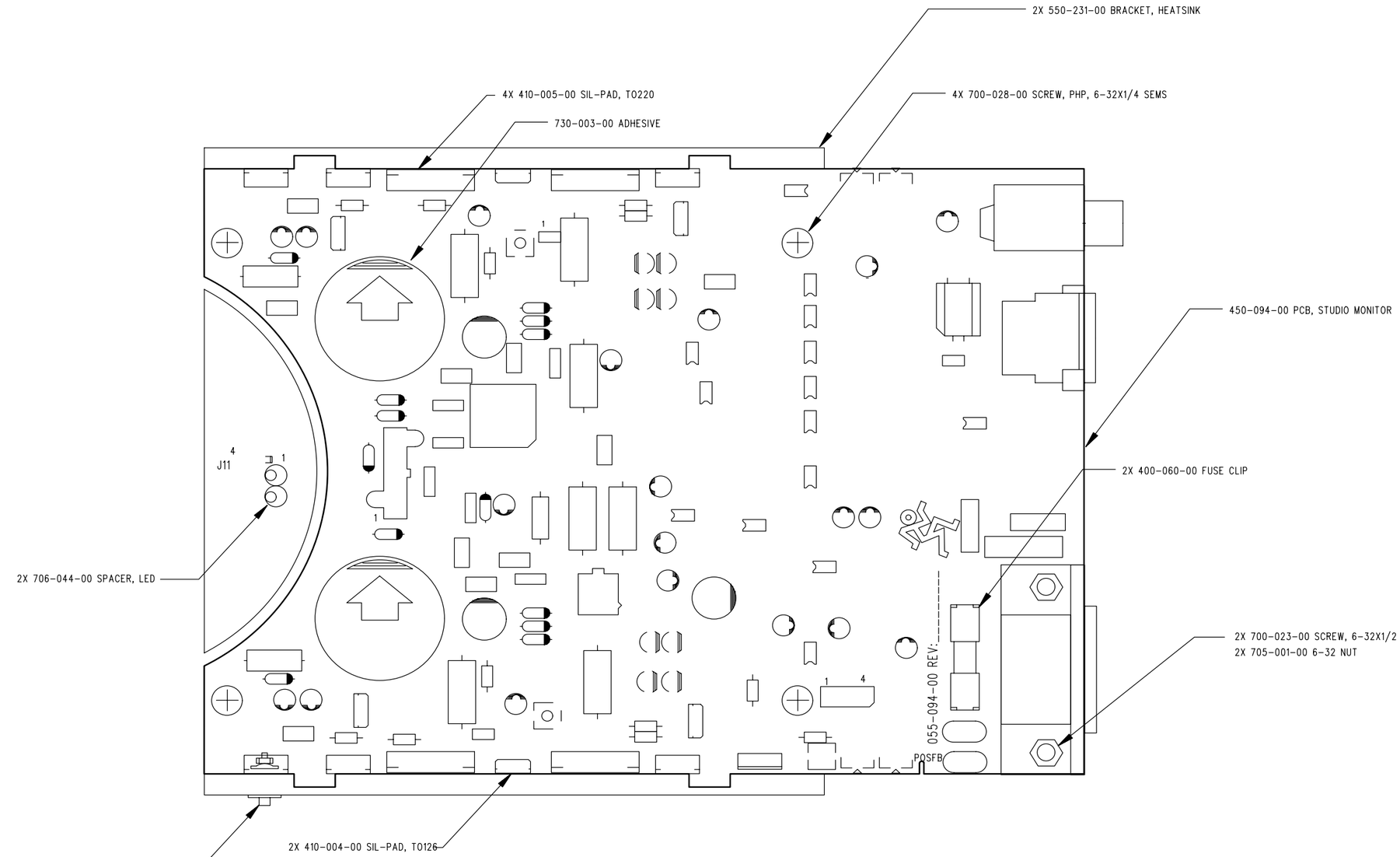
DWG. NO.	SHT	REV:
055-094-00	1	A

REVISIONS

ECO#	REV:	DESCRIPTION	REV. BY:	APP. BY:	DATE



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS: DECIMALS: ANGLES: ±NA .XX ± NA ±NA .XXX ± NA	APPROVALS	DATE
	DRAWN: trh	7-14-97
	CHECKED:	
	NP ENGINEERING:	
MATERIAL:	MATERIAL:	
	MANUFACTURING:	
FINISH:	MFG ENGINEERING:	
DO NOT SCALE DRAWING	ISSUED:	

MACKIE.
Mackie Designs Inc. Woodinville, Wa.

PCB ASSY, STUDIO MONITOR

SIZE	SCALE:	DWG. NO.	REV.
D	2:1	055-094-00	A

DWG FILE:

SHEET 1 OF 2

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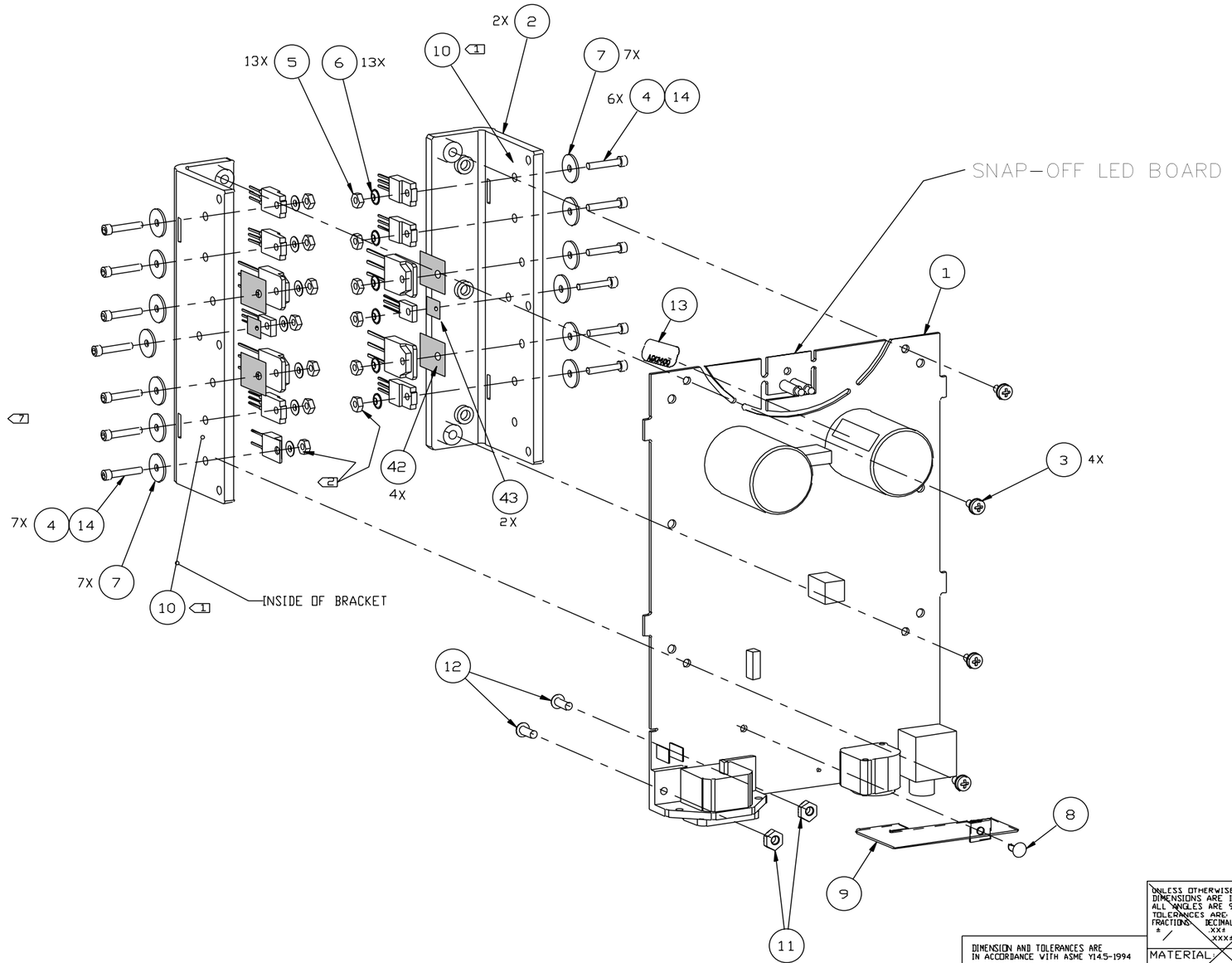
BACK

DWG. NO.	SHT	REV.
080-038-00	1	A

REVISIONS

ECO#	REV.	DESCRIPTION	REV. BY:	APP. BY:	DATE
1382	A	PRODUCTION RELEASE	KD		8/3/97



ITEM	QTY	PART NO.	DESCRIPTION
43	2	410-004-00	INSULATING SIL-PAD TO-126
42	4	410-005-00	INSULATING SIL-PAD TO-220
14	AR	730-025-00	LOCTITE 222
13	1	840-075-00	LABEL, SN HR824 AG
12	2	700-023-00	SCR MACH 6-32X1/2
11	2	705-001-00	KEPNUT 6-32
10	AR	730-001-00	THERMAL JOINT COMPOUND
9	1	780-043-00	INSULATOR, PCB
8	1	712-038-00	RIVET, NYLON
7	13	710-022-00	WASHER, FLAT
6	13	710-020-00	WASHER, COMPRESSION
5	13	705-016-00	NUT, 4-40
4	13	700-058-03	SCREW, SKT HD, 4-40 X 5/8
3	4	700-028-00	SCW,SEM PHP,BLK,6-32 X 1/4
2	2	550-231-00	BRACKET, HEATSINK
1	1	055-094-00	PCB ASSEMBLY

NOTES: UNLESS OTHERWISE SPECIFIED

1. APPLY A THIN COAT OF ITEM 10 THERMAL JOINT COMPOUND BETWEEN SEMI- CONDUCTORS AND HEATSINKS, ITEM 2 (EXCEPT WHERE SIL-PADS ARE USED)

DIMENSION AND TOLERANCES ARE IN ACCORDANCE WITH ASME Y14.5-1994

THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND CONFIDENTIAL PROPERTY OF MACKIE DESIGNS INC.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ALL ANGLES ARE 90° TOLERANCES ARE: FRACTIONS ± | DECIMALS .XX± .XXX± | ANGLES ±

MATERIAL:

FINISH:

APPROVALS	DATE
DRAWN: K. OLEARAIN	97/8/3
CHECKED:	
NP ENGINEERING:	
MATERIAL:	
MANUFACTURING:	
MFG ENGINEERING:	
ISSUED:	

MACKIE.™ Mackie Designs Inc. Woodinville, Wa

HR824 BOARD WITH HEATSINK

SIZE	SCALE:	DWG. NO.	REV.
D	1:1	080-038-00	

DWG FILE: | SHEET 1 1

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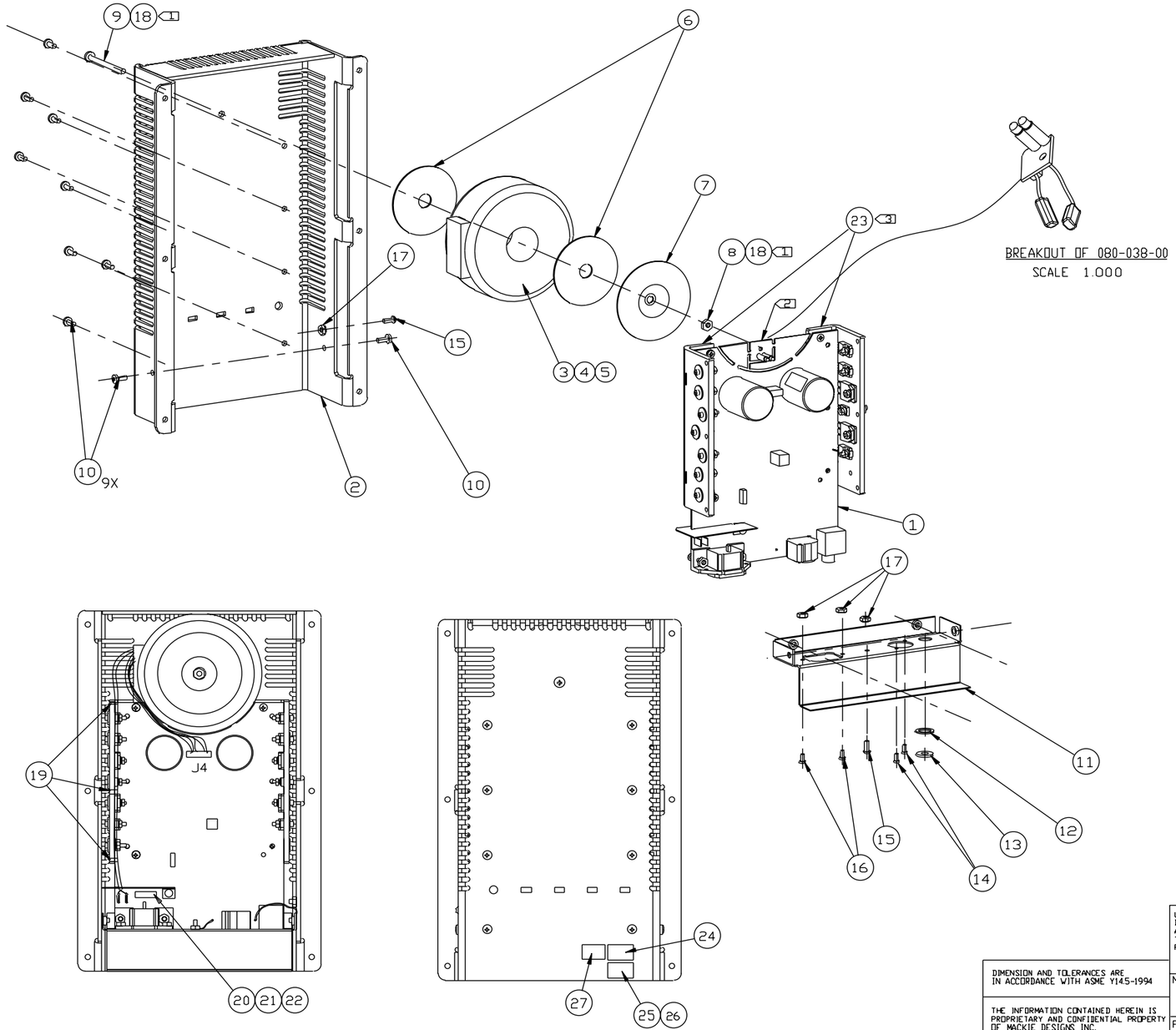
DWG. NO.	SHT	REV.
080-039-XX	1	A

REVISIONS

ECO#	REV.	DESCRIPTION	REV. BY:	APP. BY:	DATE
1382	A	PRODUCTION RELEASE	LLH		



ITEM	-00	-01	-02	PART NUMBER	DESCRIPTION
	120 VAC	230 VAC	100 VAC		
	DASH #/QTY			PARTS LIST	
27	1	1	1	840-075-00	LABEL -SN HR824 AG
26			1	840-077-00	LABEL -100V 50/60HZ 100W
25		1		840-076-00	LABEL -230V 50/60HZ 100W
24	1	1	1	840-024-00	LABEL DATE CODE
23	AR	AR	AR	730-001-00	THERMAL COTE
22			1	510-026-00	FUSE SB 3.15A 5X 0MM 250V
21		1		510-025-00	FUSE SB 1.25A 5X20MM 250V
20	1			510-029-00	FUSE SB 2.5A 5X20MM 250V
19	3	3	3	740-001-00	TYRAP 3-1/4L
18	AR	AR	AR	730-016-00	LOCTITE 242
17	4	4	4	705-001-00	NUT LOCK 6-32
16	2	2	2	700-030-04	SCR MCH 6-32X3/8 PHP BLKZC
15	2	2	2	700-031-02	SCR MCH 6-32X3/8 BTN PIN BLKZC
14	2	2	2	700-055-00	SCR MCH 4-24X3/8 PHP BLK HI-LO
13	1	1	1	705-015-00	NUT SLOT NCKL (SPLD W/JACK)
12	1	1	1	710-019-00	WASHER FIBRE BLK (SPLD W/JACK)
11	1	1	1	550-230-00	SMTL BRKT INTERCONNECT
10	10	10	10	700-005-00	SCR SEM 8-32X1/2 PHP BLKZC
9	1	1	1	700-052-00	SCR MCH 10-32X2-1/4 PHP BLKZC
8	1	1	1	705-011-00	NUT LOCK 10-32
7	1	1	1	550-248-00	SMTL PLATE XFMR MTG (SPLD W/XFMR)
6	2	2	2	780-107-00	RUBBER WASHER (SPLD W/XFMR)
5			1	600-019-02	XFMR HR824 100V
4		1		600-019-01	XFMR HR824 230V
3	1			600-019-00	XFMR HR824 120V
2	1	1	1	550-228-00	SMTL REAR COVER
1	1	1	1	080-038-00	BOARD W/ HEATSINK

NOTES: UNLESS OTHERWISE SPECIFIED

1. APPLY LOCITE ITEM (18) TO ITEM (9) AND ITEM (8)
2. BREAKOUT BOARD (INCLUDING HALF CIRCLE), BEFORE INSTALLING TO ITEM (2), USE LED ON 090-056-XX
3. APPLY THIN COAT OF ITEM (26) TO ENTIRE BOTTOM OF BOTH HEATSINKS.

DIMENSION AND TOLERANCES ARE IN ACCORDANCE WITH ASME Y14.5-1994

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DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. ALL ANGLES ARE 90° TOLERANCES ARE: FRACTIONS ± / DECIMALS XX± XXX± / ANGLES ±

MATERIAL

FINISH:

APPROVALS	DATE
DRAWN: LHETZEL	8/10/97
CHECKED:	
NP ENGINEERING:	
MATERIAL:	
MANUFACTURING:	
MFG ENGINEERING:	
ISSUED:	

MACKIE.™ Mackie Designs Inc. Woodinville, Wa

AMPLIFIER SUBASSY - HR824

SIZE	SCALE:	DWG. NO.	REV.
D	1:2	080-039-XX	A
DWG FILE:		SHEET 1 1	

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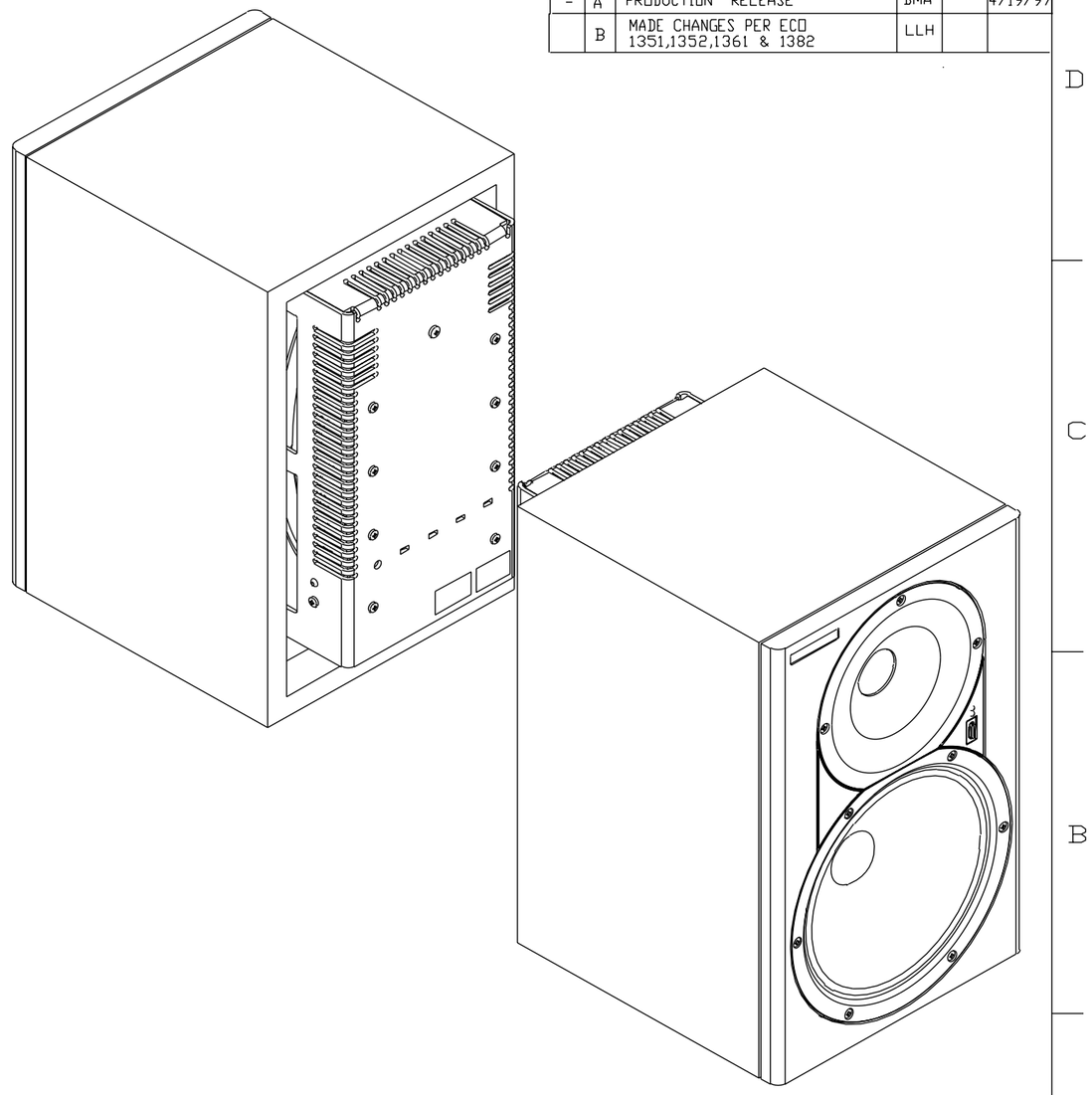
DWG. NO.	SHT	REV:
090-056-XX	1	B

REVISIONS

ECO#	REV:	DESCRIPTION	REV. BY:	APP. BY:	DATE
-	A	PRODUCTION RELEASE	BMA		4/19/97
	B	MADE CHANGES PER ECO 1351,1352,1361 & 1382	LLH		

NOTES (UNLESS OTHERWISE SPECIFIED)
1. ASSEMBLE PER MACKIE ASSEMBLY STANDARDS.
[2] BOND MAGENETS ITEM #9 & ITEM #10 USING ITEM #41 ACTIVATE LOCTITE WITH ITEM #16
[3] THREAD BUNDLE THROUGH CUT OUT IN PASSIVATE RADIATOR ASSY. (SEE HR824 WIRING HARNESS ASSY INSTRUCTION SHEET) NOTE MAX. DISTANCE OF BUNDLE. INSTALLED DISTANCE IS 1/2 - 3/8" INSIDE CABINET HOLE.
[4] BEND ITEMS 24 AND 25 FOAM PARTS INTO SPEAKER BOX, THEN USE ITEMS 18 AND 17 TO SECURE (ITEM #24) FOAM.
[5] SEE PARTS LIST FOR APPROPRIATE FUSE AND TRANSFORMER.
[6] LED BOARD FROM 080-038-00 AFTER 080-039-00

ITEM	-00	-01	-02	PART NUMBER	DESCRIPTION	SHEET
	120 VAC	230 VAC	100 VAC			
	DASH #/QTY			PARTS LIST		
41	AR	AR	AR	730-021-00	LOCTITE 326	2
40	1	1	1	840-074-00	LBL MACKIE LOGO 3D	3
39			1	640-002-02	LINECORD (100V)	NS
38		1		640-002-01	LINECORD (230V)	NS
37	1			640-001-00	LINECORD (120V)	NS
36	1	1	1	790-002-00	12 X 18 POLY BAG FOR MANUAL	NS
35			1	840-035-00	PACK SLIP POCKET- KORG	NS
34	1	1	1	830-021-00	BIRTH CERTIFICATE	NS
33	1			830-017-00	CARD REG, & WARR - HR SERIES	NS
32	1	1	1	820-063-00	OWNERS MANUAL, ENGLISH, DOMESTIC	NS
31	1	1	1	810-060-00	INST COLLAR 2	NS
30	1	1	1	810-059-00	INST COLLAR	NS
29	8	8	8	810-058-00	INST CORNER	NS
28	1	1	1	800-068-00	BOX SHIP OUTER	NS
27	1	1	1	800-067-00	BOX SHIP INNER	NS
26	1	1	1	790-019-00	POLY FOAM 28"	NS
25	1	1	1	810-052-00	FOAM TWEETER	3
24	1	1	1	810-050-00	FOAM WOOFER	3
23	1	1	1	780-103-00	GASKET WOOFER	2
22	1	1	1	780-110-00	GASKET PASSIVE	3
21	1	1	1	780-102-00	GASKET WAVE GUIDE	2
20	3	3	3	740-001-00	TYRAP 3-1/4L	4
19	4	4	4	750-002-00	BUMPON FLT RND BLK, 14H	NS
18	AR	AR	AR	730-019-00	ACCELERATOR, BLK MAGIC 737 ADHESIVE	3
17	AR	AR	AR	730-027-00	LOCTITE 410 ADHESIVE	3
16	AR	AR	AR	730-022-00	PRIMER FOR LOCITITE 326	2
15	17	17	17	701-012-05	SCR SM A-B 8X1 PAN TORX BLK OX	2
14	5	5	5	710-005-00	WASHER INSTAR N06 BLK	2
13	5	5	5	700-010-04	SCR TF 6-32X 3/8 PHP BLKZC	2
12	1	1	1	551-501-00	CAST WAVE GUIDE	2
11	1	1	1	500-016-00	SW RCKR SPST 6A/250V	2
10	1	1	1	490-017-00	SPEAKER BUCKING MAGNET WOOFER	2
9	1	1	1	490-016-00	SPEAKER BUCKING MAGNET TWEETER	2
8	1	1	1	490-010-00	CABINET SPEAKER	2
7	1	1	1	490-003-00	TWEETER 1" ALUM 60HM	2
6	1	1	1	490-001-00	WOOFER 8IN 40HM	2
5	1	1	1	080-046-00	HARNESS, CABLES HR824	3
4	1	1	1	080-029-00	SUB ASSY PASSIVE RADIATOR	3
3			1	080-039-02	SUB ASSY AMPLIFIER	3
2		1		080-039-01	SUB ASSY AMPLIFIER	3
1	1			080-039-00	SUB ASSY AMPLIFIER	3



DIMENSION AND TOLERANCES ARE IN ACCORDANCE WITH ASME Y14.5-1994

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DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ALL ANGLES ARE 90° TOLERANCES ARE: FRACTIONS ± / DECIMALS .XX± .XXX± ANGLES ±

MATERIAL:

FINISH:

APPROVALS	DATE
DRAWN: B.ARCHER	1/27/97
CHECKED:	
NP ENGINEERING:	
MATERIAL:	
MANUFACTURING:	
MFG ENGINEERING:	
ISSUED:	

MACKIE.™ Mackie Designs Inc. Woodinville, Wa

SPEAKER ASSEMBLY

SIZE	SCALE:	DWG. NO.	REV.
D	.5X	090-056-XX	B

DWG FILE 090-056-00 SHEET 1 4

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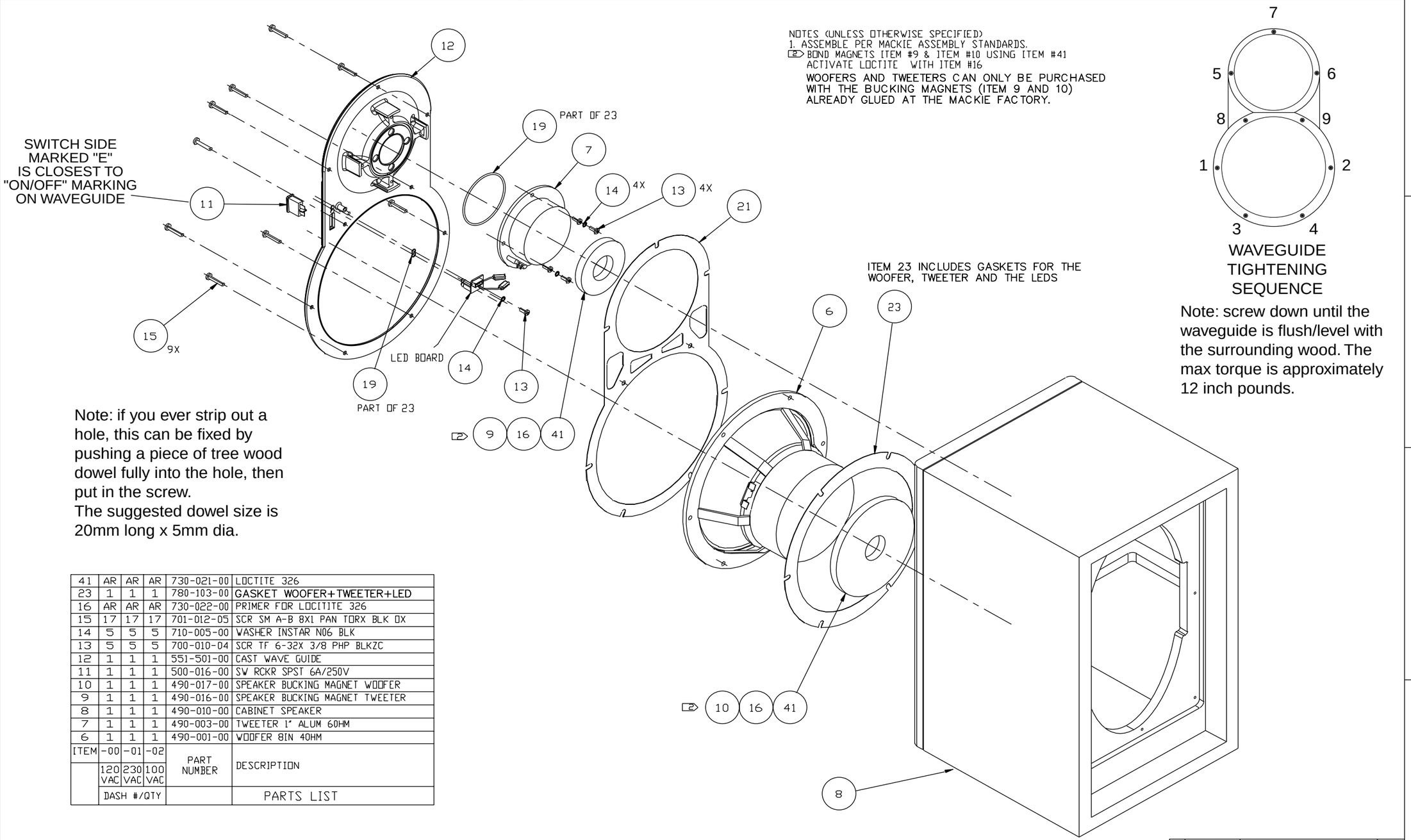

NOTES (UNLESS OTHERWISE SPECIFIED)
1. ASSEMBLE PER MACKIE ASSEMBLY STANDARDS.
2. BOND MAGNETS ITEM #9 & ITEM #10 USING ITEM #41 ACTIVATE LOCTITE WITH ITEM #16
   WOOFERS AND TWEETERS CAN ONLY BE PURCHASED WITH THE BUCKING MAGNETS (ITEM 9 AND 10) ALREADY GLUED AT THE MACKIE FACTORY.

ITEM 23 INCLUDES GASKETS FOR THE WOOFER, TWEETER AND THE LEDS

WAVEGUIDE TIGHTENING SEQUENCE

Note: screw down until the waveguide is flush/level with the surrounding wood. The max torque is approximately 12 inch pounds.

Note: if you ever strip out a hole, this can be fixed by pushing a piece of tree wood dowel fully into the hole, then put in the screw.
The suggested dowel size is 20mm long x 5mm dia.

ITEM	-00	-01	-02	PART NUMBER	DESCRIPTION
	120 VAC	230 VAC	100 VAC		
	DASH #/QTY				PARTS LIST
41	AR	AR	AR	730-021-00	LOCTITE 326
23	1	1	1	780-103-00	GASKET WOOFER+TWEETER+LED
16	AR	AR	AR	730-022-00	PRIMER FOR LOCITITE 326
15	17	17	17	701-012-05	SCR SM A-B 8X1 PAN TORX BLK OX
14	5	5	5	710-005-00	WASHER INSTAR N06 BLK
13	5	5	5	700-010-04	SCR TF 6-32X 3/8 PHP BLKZC
12	1	1	1	551-501-00	CAST WAVE GUIDE
11	1	1	1	500-016-00	SW RCKR SPST 6A/250V
10	1	1	1	490-017-00	SPEAKER BUCKING MAGNET WOOFER
9	1	1	1	490-016-00	SPEAKER BUCKING MAGNET TWEETER
8	1	1	1	490-010-00	CABINET SPEAKER
7	1	1	1	490-003-00	TWEETER 1" ALUM 6OHM
6	1	1	1	490-001-00	WOOFER 8IN 4OHM

SIZE	SCALE:	DWG. NO.	REV.
D	.5X	090-056-XX	B
DWG FILE: 090-056-00.DRW			SHEET 2 OF 4

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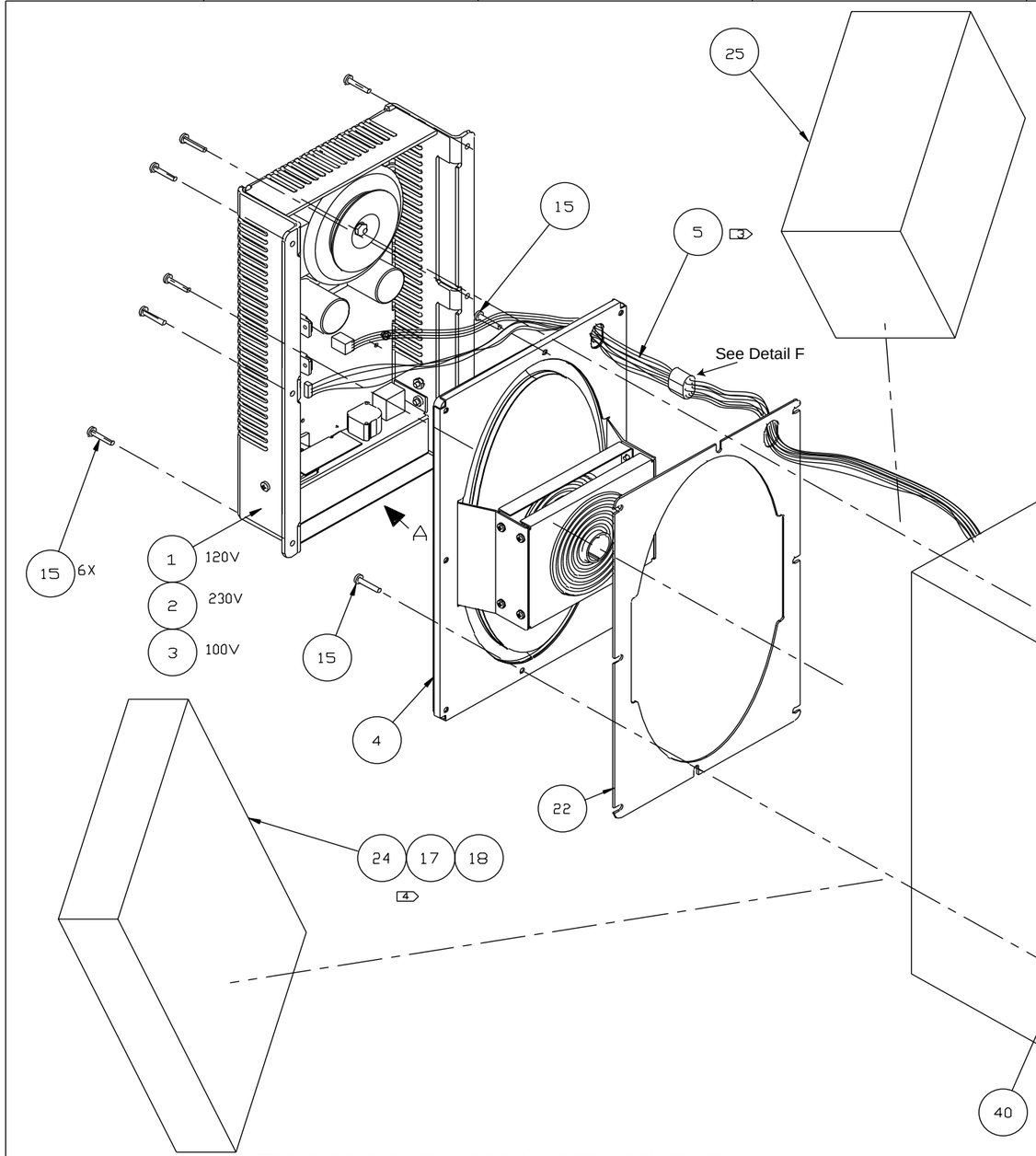
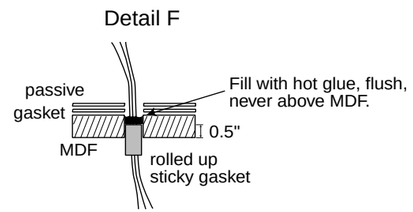
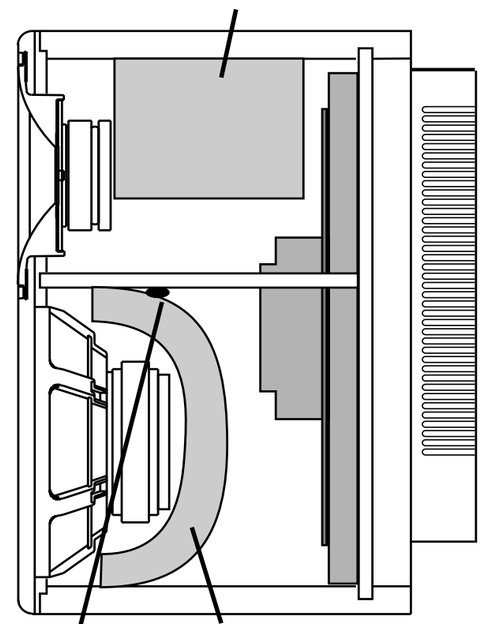




ITEM	-00	-01	-02	PART NUMBER	DESCRIPTION
	120 VAC	230 VAC	100 VAC		
	DASH #/QTY			PARTS LIST	
40	1	1	1	840-074-00	LBL MACKIE LOGO 3D
25	1	1	1	810-052-00	FOAM TWEETER
24	1	1	1	810-050-00	FOAM WOOFER
22	1	1	1	780-110-00	GASKET PASSIVE
18	AR	AR	AR	730-019-00	ACCELERATOR, BLK MAGIC 737 ADHESIVE
17	AR	AR	AR	730-027-00	LOCTITE 410 ADHESIVE
5	1	1	1	080-046-00	HARNESS, CABLES HR824
4	1	1	1	080-029-00	SUB ASSY PASSIVE RADIATOR
3			1	080-039-02	SUB ASSY AMPLIFIER
2		1		080-039-01	SUB ASSY AMPLIFIER
1	1			080-039-00	SUB ASSY AMPLIFIER

TWEETER FOAM
MAKE SURE IT IS PUSHED ALL THE WAY DOWN TOWARDS THE TWEETER



WOOFER FOAM
GLUE TO H BRACE WITH LOCTITE 410 AND BLACK MAGIC ACCELERATOR
MAKE SURE THE FOAM DOES NOT TOUCH THE PASSIVE RADIATOR.

3 THREAD BUNDLE THROUGH CUT OUT IN PASSIVE RADIATOR ASSY. (SEE HR824 WIRING HARNESS ASSY INSTRUCTION SHEET) NOTE MAX. DISTANCE OF BUNDLE. INSTALLED DISTANCE IS 1/2 - 3/8" INSIDE CABINET HOLE.

4 BEND ITEMS 24 AND 25 FOAM PARTS INTO SPEAKER BOX, THEN USE ITEMS 18 AND 17 TO SECURE (ITEM #24) FOAM.

SIZE	SCALE:	DWG. NO.	REV.
D	.5X	090-056-XX	B
DWG FILE: 090-056-00.DRW			SHEET 3 OF 4

A-12 HR824 ASSEMBLY

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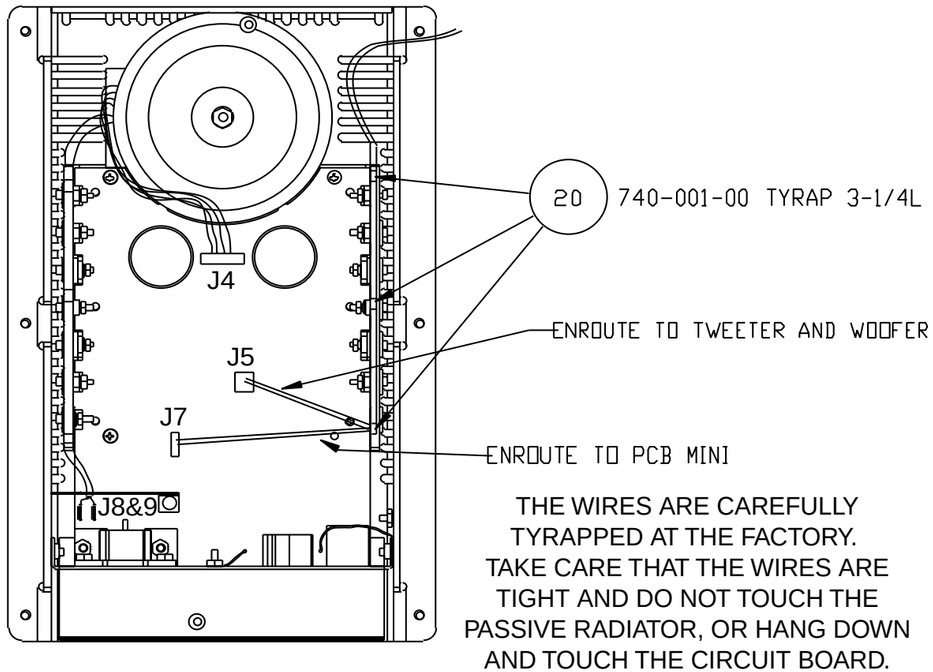
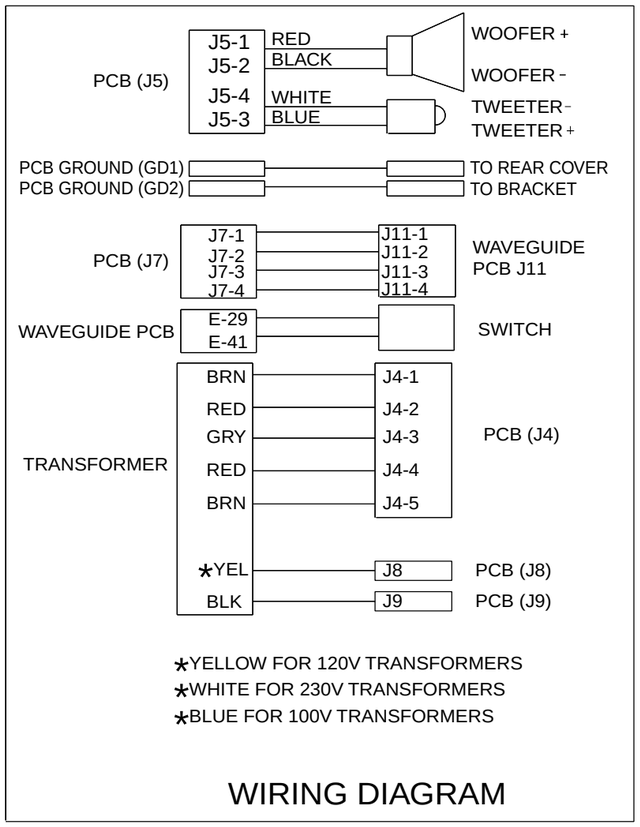
TRANSFORMER WIRING		
WIRE/PIN	COLOR	CONNECTION
5 1	YEL/WHT/BLU	TO J9
2	BLACK	TO J8
3	BROWN	PIN 1-J4
4	RED	PIN 2-J4
5	GREY	PIN 3-J4
6	RED	PIN 4-J4
7	BROWN	PIN 5-J4

5 SEE PARTS LIST FOR APPROPRIATE FUSE AND TRANSFORMER.



THE WIRES ARE CAREFULLY TYRAPPED AT THE FACTORY. TAKE CARE THAT THE WIRES ARE TIGHT AND DO NOT TOUCH THE PASSIVE RADIATOR, OR HANG DOWN AND TOUCH THE CIRCUIT BOARD.



*YELLOW FOR 120V TRANSFORMERS
*WHITE FOR 230V TRANSFORMERS
*BLUE FOR 100V TRANSFORMERS

WIRING DIAGRAM

SIZE	SCALE:	DWG. NO.	REV.
D	.5X	090-056-XX	B
DWG FILE 090-056-00		SHEET 4 OF 4	

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